SUPREME COURT OF THE UNITED STATES.

No. 206.

ALONZO V. BLANCHARD, JOHN D. BLANCHARD, AND FRANKLIN BLANCHARD, PARTNERS AS A. V. BLANCHARD & CO., PLAINTIFFS IN ERROR,

vs.

ANTOINE PUTTMAN, CONRAD WEAVER, AND JOHN BITTINGER.

IN ERROR TO THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF OHIO.

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1 At a Circuit Court of the United States within and for the seventh judicial circuit and southern district of Ohio, begun and held at the court-house, in the city of Cincinnati, on the first Tuesday, being the third day of October, in the year of our Lord one thousand eight hundred and sixty-five, and of the independence of the United States of America the ninetieth. Present: The Hon. N. H. Swayne and the Hon. H. H. Leavitt, judges of said court; among the proceedings had were the following, to wit:

Trespass on the case.

ALONZO V. BLANCHARD, JOHN D. BLANCHARD, and Franklin Blanchard, partners under the name of A. V. Blanchard & Co.,
vs.
ANTOINE PUTTMAN, CONRAD WEAVER, AND JOHN Bittinger.

Be it remembered that heretofore, to wit, on the twenty-third day November, in the year of our Lord one thousand eight hundred and sixty-five, came the plaintiffs, by their attorney, and sued out of the clerk's office of said court a certain writ of summons, ad respondendum, against the defendants, in the words and figures following, to wit:

Summons.

UNITED STATES OF AMERICA, *Southern District of Ohio, ss:*

The President of the United States of America to the marshal of the southern district of Ohio, greeting:

You are commanded to summon Antoine Puttman, Conrad Weaver, and John Bittinger, citizens of, and resident in, the State of Ohio, if they be found in your district, to be and appear in the Circuit Court of the United States for the southern district of Ohio,
2 aforesaid, at Cincinnati, on the second Tuesday in the month of December, 1865, to answer unto Alonzo V. Blanchard, John D. Blanchard, and Franklin Blanchard, partners, under name of A. V. Blanchard & Co., citizens of, and resident in, the State of Ohio, of a plea of trespass on the case; and have you then and there this writ.

Witness the Honorable Salmon P. Chase, Chief Justice of the United States, this 23d day of Nov., A. D. 1865, and in the 90th year of the independence of the United States of America.

[SEAL.] Attest: JOHN McLEAN, *Clerk.*

Cause of action.

On which said writ is the following endorsement, to wit: Suit brought for infringing a patent granted Thomas Blanchard, Dec. 18th, 1849. Reissued, extended, and assigned to the plaintiff. Dam., $5,000. G. M. Lee, pl'ffs' att'y.

And afterwards, but on the same day, came the plaintiffs by their attorney, and filed their certain declaration herein, in the words and figures following, to wit:

Circuit Court of the United States for the 7th circuit and southern district of Ohio, October term, A. D. 1865.

Declaration.

ALONZO V. BLANCHARD, JOHN D. BLANCHARD, and Franklin Blanchard, partners, under the name of A. V. Blanchard & Co., *vs.* ANTOINE PUTTMAN, CONRAD WEAVER, AND John Bittinger.	Trespass on the case.

The plaintiffs, A. V. Blanchard & Co., come and complain of the defendants, Antoine Puttman, Conrad Weaver, and John Bittinger, in a plea of trespass on the case, for that whereas Thomas Blanchard, before and at the time of the making of the letters patent,
3 and of the committing the grievances, by the said defendants, hereinafter next mentioned, was the original and first inventor of a certain new and useful improvement in bending wood, to wit, at Boston, in Massachusetts, in the district aforesaid; and thereupon, heretofore, to wit, on the 18th day of December, A. D. 1849, at the city of Washington, to wit, in the district aforesaid, certain letters patent under the hand of the Secretary of the Interior of the United States, with the seal of the Patent Office of the United States thereto affixed, countersigned by the Commissioner of Patents of the United States, bearing date the year last aforesaid, were granted to said Thomas Blanchard, (which letters patent, or a duly authenticated copy thereof, (the plaintiffs now bring into court,) whereby was granted and secured to the said Thomas Blanchard, his heirs, administrators, or assigns for the term of fourteen years, from said 18th day of December, A. D. 1849, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention, a full and exact description of which, with the mode of constructing and applying the same, is set forth in the written specification or description of the said Thomas Blanchard, in the words of the said Blanchard, filled in the Patent Office of the United States before the granting of said letters patent, and made part of the same, as by reference to the aforesaid specification or description (here brought into court as aforesaid) will more fully and
4 at large appear. The plaintiffs further say, that said invention, so patented, was new and useful; that the said Thomas Blanchard was at the time of his application for said patent, a citizen of the United States; that he was the original and first inventor of said invention so patented; and that the same was not known, and was not in public use before his said invention or on sale with his consent or allowance for more than two years before his application

for said letters patent. The plaintiffs further say, that afterwards, to wit, on the 15th day of November, A. D. 1859, said letters patent were reissued to said Thomas Blanchard, and that they were renewed and extended by the government of the United States for the term of seven years from and after the expiration of said first term of fourteen years. The plaintiffs further say, that afterwards, to wit, on the first day of November, A. D. 1864, said Thomas Blanchard being dead, and Laura Blanchard being the executrix of his last will and testament, and said letters patent having been reissued and renewed, the same were, by said Laura Blanchard, executrix, assigned to plaintiffs. The plaintiffs further say, that they have heretofore made, constructed, used, and vended to others to be used, said invention to their great advantage and profit, to wit, at the district aforesaid; yet the said defendants well knowing the premises, but contriving and wrongfully intending to injure
5 the said plaintiffs, and to deprive them of the profits, benefit, and advantage which he might, and otherwise would have derived and acquired from the making, constructing, using, and vending to others to be used, the said invention, after the making of said letters patent, after the renewal thereof, after the assignment to plaintiffs as aforesaid, and within the said term of years in the said letters patent, mentioned to wit, on the 2d day of November, A. D. 1864, at the State of Ohio, to wit, in the district aforesaid, and on divers other days and times between that day and the commencement of this suit, unlawfully and unjustly against the will of said plaintiff, and without leave or license of the said plaintiff, did use ten machines, for bending wood, in imitation of said invention in breach of said letters patent, and in violation and infringement of the exclusive right thereto, so as aforesaid, acquired by the plaintiffs, and contrary to the form of the statutes in such case made and provided, whereby the said plaintiffs have been greatly injured and deprived of a great part of the profits and advantages which they might, and otherwise would have derived and acquired from the said invention, to wit, at the district aforesaid, to plaintiff damage $5,000, and therefore they sue.

G. W. LEE,
Pl'ffs' Att'y.

And afterwards, to wit, on the 25th day of November, in the
6 year and at the term last aforesaid, came the marshal of said district, to whom said writ was in form aforesaid directed, and returned the same into the clerk's office of said court with his proceeding endorsed thereon, in the words and figures following, to wit:

Marshal's retnrn.

Served the within-named Antoine Puttman, Conrad Weaver, and John Bittinger, each personally, by copy.

A. C. SANDS, *U. S. Marshal,*
By E. L. QUINTON, *Deputy.*

And afterwards, to wit, on the 12th day of January, in the year of our Lord one thousand eight hundred and sixty-six, an entry was made on the journal of said court, as follows, to wit:

On motion to the court, it is ordered that the default herein be, and the same hereby is, set aside, and that defendants have leave to plead forthwith, and plea filed, which said plea is in the words and figures following, to wit:

Circuit Court of the United States for the southern district of Ohio.

Plea.

ANTOINE PUTTMAN, CONRAD WEAVER, and John Bittinger
ads.
ALONZO V. BLANCHARD, JOHN D. BLANCHard, and Franklin Blanchard, partners. } In case.

And now come the said defendants, Antoine Puttman, Conrad Weaver, and John Bittinger, by Samuel S. Fisher, their attorney, and defend, &c., when, &c., and say they are not guilty of the said supposed grievance above laid to their charge, or any or either of them, or any part thereof, in manner and form as the said plaintiffs have above complained against them, and of this the defend-
7 ants put themselves upon the country, and the said plaintiffs do the like.

SAM'L S. FISHER,
Def'ts' Att'y.

And afterwards this case was continued from term to term, until the February term, in the year of our Lord 1867, when the following entry was made upon the journal of said court:

Journal entry.

ALONZO V. BLANCHARD, JOHN D. BLANCHARD, and Franklin Blanchard, partners, as A. V. Blanchard & Co.,
vs.
ANTOINE PUTTMAN, CONRAD WEAVER, and JOHN Bittinger. } Trespass on the case.

This day came the parties, by their attorneys, and thereupon came a jury, to wit: Lysle Lodwick, John Barry, Martin Brown, Michael Dougherty, C. M. Murch, J. D. Thorp, W. R. Dill, F. A. Wright, H. Von Puhl, John Boner, W. C. Hickox, and Benjamin Sebastian, who were duly empanelled, and sworn the truth to speak upon the issue joined between the parties; and the evidence not being finished the court adjourned the jury until half past nine o'clock to-morrow morning, to which time this cause is continued.

And afterwards, to wit, on the 21st day of February, in the year and at the term last aforesaid, the following entry was made upon the journal of said court:

Journal entry.

A. V. BLANCHARD & CO.
vs.
ANTOINE PUTTMAN *et al.*
} Trespass on the case.

This day again came the parties, by their attorneys, and also the jurors heretofore empannelled and sworn the truth to speak upon the issue joined; and the evidence not being finished, the court adjourned the jury until half past nine o'clock to-morrow morning, to which time this cause is continued.

And afterwards, on the 23d of February, in the year and
8 at the term last aforesaid, the following entry was made in the journal of said court:

Journal entry.

A. V. BLANCHARD & CO.
vs.
ANTOINE PUTTMAN *et al.*
} Trespass on the case.

This day again came the parties, by their attorneys, and also the jurors heretofore empannelled, sworn, and affirmed well and truly to try the issue joined between the parties; and the evidence being finished, but counsel not having concluded their arguments, the court adjourned the jury until half past nine o'clock Monday morning next, to which time this cause it continued.

And afterwards, to wit, on the 25th day of February, in the year and at the term last aforesaid, the following entry was made in the journal of said court:

Journal entry.

A. V. BLANCHARD & CO.
vs.
ANTOINE PUTTMAN *et al.*
} Trespass on the case.

This day again came the parties, by their attorneys, and also the jurors heretofore empannelled, sworn, and affirmed well and truly to try the issue joined between the parties; and the jury having heard the evidence, the arguments of counsel, and the charge of the court, retired to their room, attended by an officer of this court, to deliberate upon a verdict.

And afterwards, to wit, on the 26th day of February, in the year and at the term last aforesaid, the following entry was made in the journal of said court:

Journal entry.

A. V. BLANCHARD & CO.
vs.
ANTOINE PUTTMAN *et al.*
} Trespass on the case.

This day again came the parties, by their attorneys, and
9 also the jurors heretofore empannelled, sworn, and affirmed

well and truly to try the issue joined between the parties, who, upon their oaths and affirmations, do say that the said defendants are not guilty in manner and form as the said plaintiffs hath complained against them. Therefore it is considered that the defendants go hence without day, and recover of the said plaintiffs their costs herein expended, taxed to $; and execution is therefore awarded.

And afterwards, to wit, on the 5th day of March, in the year and at the term last aforesaid, came the plaintiffs, by their attorney, and filed their bill of exceptions, and the following entry was made upon the journals of said court:

Entry.

A. V. BLANCHARD & Co. } vs. ANTOINE PUTTMAN *et al.* } Trespass.

This day came the plaintiffs, by their attorney, and filed their bill of exceptions to the ruling of the court, and pray that the same may be allowed and entered of record, which is accordingly done; which said bill of exceptions is in the words and figures following, to wit:

U. S. Cir. Court, south. dist. of Ohio.

Bill of exceptions.

A. V. BLANCHARD & Co. } vs. ANTOINE PUTTMAN *et al.* }

Be it remembered, that on the trial of this cause the plaintiffs, to sustain the issue on their part, put in evidence the reissued patent granted by the United States to Thomas Blanchard, dated November 15th, 1859, and also the renewal thereof, and the extension endorsed on said patent, which reissued patent is hereto appended and made part of this bill, marked "A." The plaintiffs also put in evidence the certified copy of the original patent granted Thomas Blanchard, December 18th, 1849, and hereto appended and made part of this bill, marked "B;" and having proved the assignment of said patent to them, and that they were the owners of said patent, and having farther introduced evidence tending to show that defendants had used a machine which infringed said patent and the profits derived by defendants from said use, rested their case.

Whereupon the defendants, to sustain the issue on their part, put in evidence the reissued patent granted to John C. Morris, dated May 27th, A. D. 1862, to the admission of which as evidence the plaintiffs objected, claiming it not proper evidence; but the court overruled said objection and admitted said patent, to which ruling plaintiffs then excepted.

The defendants further proved that they were using their machine, here sued, as licensees under said John E. Morris's patent, by license

from said Morris, and that their machine was constructed in accordance with said patent. Defendants further offered in evidence the deposition of Edward S. Renwick, hereto attached, marked "C," and made part of this bill; and with said deposition there was put in evidence the affidavits of Samuel S. Fisher and George M. Lee, and the written agreements, marked respectively "D" and "E" and "F," and attached with said deposition, and made part of
11 this bill.

Thereupon the plaintiffs objected to said deposition of Renwick being put in evidence by defendants, claiming the same was ex parte in character, and not properly certified and not taken in this case; and was not, therefore, proper evidence; but the court overuled the objection and permitted said deposition to be read in evidence, to which ruling and judgment of the court the plaintiffs then and there, in the presence of the jury, excepted, and prayed this bill of exceptions therefor, which is signed accordingly and ordered to be recorded.

Whereupon the defendants called as a witness one W. Mitchell, and offered to prove by him that in A. D. 1858 he saw in use, at the factory of Leonard Andrus, in Grand Detour, in the State of Illinois, a machine for bending plough-handles similar to a model then shown witness, and claimed by the defendants to be the same in its mode of operation as plaintiffs' patented machine, the defendants' counsel promising to hereafter connect said Mitchell's evidence with other testimony showing such a machine to have been in public use anterior to Blanchard's said invention, to which evidence the plaintiffs objected as not competent or proper; but the court overulled said objection and admitted said evidence, to which ruling the plaintiffs then and there excepted.

The defendants then offered to prove by one Christian Lees-
12 brough how a machine for bending felloes, claimed to be made in conformity to Blanchard's patent, bent felloes, and to show that it worked badly and broke much timber, to which evidence the plaintiffs then and there objected, claiming that it was not proper evidence, but the court must limit such testimony to the working of plough-handle machines. The court overruled said objection and admitted said evidence, to which ruling the plaintiffs then and there objected.

The defendants then called John Byrne as a witness, and proved by him that he had seen a machine made in conformity to the Morris' patent, and substantially the same as defendants' machine, working in the shop of John C. Morris at Cincinnati, in A. D. 1858, and that he bent timber well without relaxation, to which testimony plaintiffs objected, and claimed the evidence was not proper or competent; but the court overulled said objection and admitted said evidence, to which ruling plaintiffs then and there excepted.

Whereupon the defendants put in evidence the following patents hereto attached and made part of this bill, and marked respectively "G," "H," "I," "J," being a patent granted E. Reynolds, on July 17th, A. D. 1835; a patent granted Jonathan Mulford, January 16th,

A. D. 1835; a patent granted H. H. May, February 18th, A. D. 1846 and a patent granted Abel Gardner, Decemher 11th, A. D. 1849. Also the depositions of John Deere, Leonard Andruz, David Gaus, Stephen Hathaway, and W. K. Casterline, hereto attached and marked "K," "L," "M," "N," and "O," made part of this bill, showing the existence, in 1845, of a wood-bending machine in Illinois.

Whereupon the defendants having offered evidence tending to prove that they did not infringe the plaintiff patent rested their case.

The plaintiffs then offered in evidence the original patent granted to John C. Morris, March 11th, 1856, and hereto appended and made part of this bill, marked "P," claiming thereby to attack the validity of the aforesaid reissued patent of John C. Morris, and to show thereby fraud in said reissue, and that he was for a different thing from the original invention of said John C. Morris; but the defendants objected to the admission of said original patent in evidence, claiming it was not competent and proper evidence. And the court sustained said objection, and refused to allow said original patent, to which ruling the plaintiffs then and there, in the presence of the jury, excepted, and this bill of exceptions is signed thererefor.

The parties having closed their evidence, the plaintiffs requested the court to charge the jury in the words and figures set forth in their request to charge, being the paper hereto appended and made part of this bill, marked "R." And the court did proceed and charge the jury in the words and figures set forth in the paper called
14 "Charge of the Court," and hereto attached and made part of this bill, marked "S," to which charge of the court as given, and to the refusal of the court to charge as requested by plaintiff's counsel, and to the construction of the court given to the said Blanchard patent, the plaintiffs then and there, in the presence of the jury, excepted, and for all the aforesaid rulings, judgements, and supposed errors of the court, the plaintiffs prayed this their bill of exceptions might be signed and sealed by the court and ordered to be recorded, which is done, and ordered accordingly.

[SEAL.] H. H. LEAVITT.

And afterwards, to wit, on the 7th day of March, in the year last aforesaid, came the plaintiffs by their attorney, and filed their certain appeal bond herein, in the words and figures following, to wit:

Appeal bond.

Know all men by these presents, that we, Alonzo V. Blanchard, of the State of Massachussets, and Theodore Royer of the county of Hamilton and State of Ohio, are held and firmly bound unto Antoine Puttman, Conrad Weaver, and John Bittinger, in the penal sum of eight hundred dollars, to the payment of which, well and truly to be made, we do by these presents jointly and severally bind ourselves, our heirs, executors, and administrators.

Sealed with our seals and dated this fourth day of March, A. D. 1867.

The condition of the above obligation is such, that whereas the said A. V. Blanchard *et al.* have obtained an allowance of a writ of
15 error upon a certain judgement rendered in the Circuit Court of the United States in and for the southern district of Ohio, at the term of February, A. D. 1867, of said court, in favor of the said Antoine Puttman *et al.*, and against the said A. V. Blanchard *et al.*, for the sum of costs of suit. Now, if the said A. V. Blanchard *et al.* shall pay the condemnation-money and costs, in case the said judgment of the said Circuit Court of the United States for said district shall be affirmed by the Supreme Court of the United States, in whole or in part, then the above obligation shall be void, otherwise to remain in full force of law.

[SEAL.] THEODORE ROYER.

In presence of—
TOM. AMBROSE.
Approved:

H. H. LEAVITT.

16 The reissued letters patent No. 853, of Thomas Blanchard, referred to in the bill of exceptions filed in this cause, is in the words and figures following, to wit:

The United States of America to all to whom these letters patent shall come:

Whereas Thomas Blanchard, of Boston, Massachussets, has alleged that he has invented a new and useful improvement in bending wood (for which letters patent were issued to him, dated December 16th, 1849, which letters having been surrendered by him, the same have been canceled, and new letters ordered to issue to him on an amended specification,) which he states has not been known or used before is application; has made oath that he is a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of fifteen dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are therefore to grant, according to law, to the said Thomas Blanchard, his heirs, administrators, or assigns, for the term of fourteen years from the eighteenth day of December, one thousand eight hundred and forty-nine, the full and exclusive
17 right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Thomas Blanchard, in the schedule hereunto annexed, and is made a part of the presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this fifteenth day of November, in the year of our Lord one thousand eight hundred and fifty-nine, and of the independence of the United States of America the eighty-fourth.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

[SEAL OF THE PATENT OFFICE.]

WM. D. BISHOP,
Commissioner of Patents.

The schedule referred to in these letters patents, and making a part of the same.

To all who it may concern:

Be it know that I, Thomas Blanchard, of Boston, in the county of Suffolk, and State of Massachussets, have invented a new and improved method of bending wood, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, (Here follows drawing marked page 17,) making part of this specification, in which fig. 1 is a top view of the machine with the mould lever brought home to its place after the operation of bending is completed; fig. 2, a top view with mold lever thrown open to receive the timber previous to bending; fig. 3, a side view of the sliding beam E and bench A; fig. 4, a transverse section upon the line x x of fig. 1; fig. 5, a transverse section upon the line y y of fig. 1. In the machine heretofore contrived for the
18 purpose of bending timbers, the bed piece upon which the stick was placed, and the lever by which the bending was effected, have not been so connected together as to hold them at fixed distances from each other, and consequently, when the piece of timber, being bent, was of varying stiffness, or when it contained knots, it was liable to rise up and leave the mold wherever there was a weak place in the stick; and if the first of the operation was successful, and the part bent was followed by a stiffer portion, the former was liable to be thrown out of place by the more rigid and unyielding portion, and thus an imperfect curve was the result. And these difficulties were not remedied by the employment of flexible bands of metal or other devices intended to prevent the breaking of the timber on the outside of the bend. The above-mentioned difficulties were in most cases enhanced, if not caused to a considerable extent by the fact that the power by which the timber was bent was applied to the timber itself as a means of communicating the power to the parts to be bent.

While in the improvements to be hereinafter described, the timber is passive and the bending is effected by power applied through the mechanism employed. These machines were also defective in another particular. If the attempt should be made on them to apply any considerable pressure to the end of the timber to be bent instead of consolidating the material and causing the fibre thereof to be condensed, such pressure would only increase the tendency to

19 bulge up the timber from the mold and break it. All these difficulties have been remedied by my improved method of bending, which I will now proceed more particularly to describe. The machine represented in the accompanying drawings is designed for bending plow handles, but it is obvious that the details of the machinery must be varied when the invention is applied to bending other articles having different forms. B is the mold or lever by which the bending is effected and which is pivoted at C, to the bed-plate A, which, together with the flanch A^2, composes the bench to which the operating parts are secured. The pivot C is sustained and prevented from being bent or thrown out of position by the strain brought upon it in the act of bending by a strap M which passes over and is secured to the bed-plate. The lever B is of a length corresponding to the power required, and is curved upon its inner end to suit the bend to be given to the handle, this curve W being struck from the pivot C as a center. The piece of timber to be bent is carried by the sliding beam E, which moves longitudinally upon the bed-plate and is connected with the mould or bending lever B, as follows: D is a chain, the links of which, as well as the curved end of the mould B, are formed to correspond with the size and shape of the handle as seen in section in fig. 4. The chain is connected at one end to a sliding bar J, upon one side of the mould lever B, and at the other by means of the long straps F, with the sliding
20 beam E by a joint pin R. The straps F are a sufficient distance apart to permit the handle G to lie between them, and are connected by a pin to the last link of the chain, one on each side. H is the upsetting screw which passes through the end of the sliding beam E and comes in contact with the end of the handle G at x; by means of this screw the requisite pressure is put upon the end of the stick to condense the fibres upon the inside of the curve as well as to prevent those upon the outside from separating while bending. This end pressure also compels the stick to keep up to the end of the mould and thus perfect the bend at the end of the stick as well as at other points. I is a draft screw running longitudinally through the mould lever and entering a female screw in one end of the sliding bar J; the other end of this bar is connected with the last link of the chain, and by means of the screw the extreme end of the plow handle is griped between the last link of the chain and the mould B; handles of various sizes may thus be bent in the same machine. By means of the set-screw K passing through the flanch A^2 on one side of the bench the sliding beam E is borne up against the outside of the chain at the bending point, and thus the chain and sliding beam are kept at the required distance from the mould lever to allow the article being bent to lie between them. O is a clamp made fast to the top of the flanch by two screws; one end of this clamp is
21 bent down in form of a hook that falls into a groove on the top of the sliding beam and serves to keep that end of the beam in its place, but allows it to slide freely. The fulcrum pin C, on which the lever B turns, is supported on the top of the lever by a brace M, as before explained, through which it passes into the

bench; the other end of the brace extends across the bench over the sliding beam E, and is made fast to the stationary flanch A^2. By means of the key or wedge L the timber is held firm on its bed on the sliding beam, and is prevented from springing sidewise during the upsetting and bending process; the stick is furthermore steadied and held in place by pins z above and below it. Any number of these pins and wedges may be employed, according to the length and delicacy of the article being bent, or any other suitable devices may be employed for the purpose in their stead. After the lever B is brought down to its place, (fig. 1,) it is held fast to one end of the bench by a spring catch N.

The operation of the machine is as follows: The mould lever is thrown open at right angles with the bench, as shown in fig. 2. The timber or handle G is placed with its rounded end between the chain and the mould and in contact with the bar J; the key L is then driven in (fig. 5) to hold it in its place, but still allow it to slide endwise, sufficient to upset; the draft screw I is then turned to bring the end of the handle and end of the chain firm against
22 the mould; the set screw K is turned up to bring the beam E against the back of the chain to give it proper support. The tender then applies his hand to the upsetting screw H, and turns it forward and presses the handle endways, driving the rounded end firm against the side J, which is connected with the first link of the chain. This operation tightens the chain and completes the preparations for the bending process. Power is then applied to bring the mould lever round, which draws the sliding beam forward, with the handle as the curve is formed, the upsetting screw co-operating with the chain and mould lever to keep the plow handle up to the bar J, so as to ensure the bend at the extreme end, while the fiber in the inner part of the curve is consolidated, and that which forms the outer part of the curve is prevented from breaking. During the operation it is usually found nescessary to relax the upsetting screw a little to prevent the timber on the inside of the curve from crippling; when the mould lever is brought home to its place, the spring catch N takes hold of the end of the lever and prevents it from going back, and the work is completed. That part of the plow-handle which is bent is of an oval form, and is turned and wrought in proper shape before it is bent; it is formed deepest or thickest transversely to the curve, consequently the links or blocks that form the chain are made hollow, to conform to
23 the outside of the curve, the lever mould having a corresponding hollow to fit the inside. The chain may be dispensed with in bending large curves with flat sides, such as felloes for wheels. Where the sides have flat surfaces, a metalic strap may be substituted, and a number of pieces can be bent at once in the same mould, or a whole plank of suitable thickness may be bent at once, and be sawed into felloes afterwards. In that case there would be no side twist or winding in the operation of bending; but if they are sawed into squares before being bent, the wind or side crook may be prevented by placing a number together, and the side spring may be

prevented by side clamps to keep them in the right direction while they are being bent; these side clamps may extend around the mould, which will prevent the side movement while receiving the proper curve. In lieu of the bending mould above described a drum may be used for a mould, and this drum may be either cylindrical or elliptical, or of any figure required, and instead of actuating the mould by a lever, cog wheels may be used and any species of power applied to drive the machine. The upsetting power must be given by the screw or other mechanical power when the timber is first placed in the mould and while in its straight form, by screwing or pressing against the ends of the timber; and care should be ,taken torevent its crippling, by having clamps attached to the sliding bed. The amount of end pressure should be sufficient to condense the fibres on the inside o the curve without crippling the timber, and to prevent the fibres on the outside of the curve from being drawn apart. When the timber is in danger of being crippled by the end pressure which particularly occurs in short curves, or where the stick is thick, the upsetting screw should be relaxed gradually as the bending proceeds to a sufficient extent to relieve the timber of the excessive end pressure, and prevent the crippling as before stated. There are many mechanical methods by which the relaxation of the end pressure can be made self-acting and uniform, one of which is as follows: on the end of the upsetting screw H may be attached a bevel-tooth wheel mashing into another bevel wheel at one end of a shaft at right angles with the upsetting screw; on the other end of the shaft may be attached a spur wheel mashing into a stationary rack. As the sliding bed advances in the operation of bending, the spur wheel mashes into the stationary rack will turn the bevel gears and the upsetting screw H in a backward direction, thus relaxing the pressure against the end of the timber uniformly during the whole operation. To vary the speed of the relaxing screw for the various curves and thickness of timber to be bent, a number of spur wheels of different sizes may be placed on the shaft, so that either of them can mash into the rack at pleasure, which will vary the speed as required on the outside of the bevel wheel on the upsetting screw. Instead of a thumb-piece for operating the upsetting screw, as shown in the drawing, a crank may be substituted, which would be preferable in heavy work, to throw the screw forward with sufficient power. The bevel wheel on the screw-shaft H may be connected with it by a rachet wheel and pall, so that the screw can be driven forward when the timber is first placed in the sliding bed, by turning the crank without revolving the gear work; and when it is reversed by the gear, the pall will take hold of the ratchet wheel, which is made fast to the screw-shaft. Having thus described my improved method of bending wood, and having shown one form of machine embodying the same, adapted to the bending of plow-handles, it is obvious that the same method may be applied to the bending of a great variety of forms adapted to a great variety of purposes, and that the details of the mechanism may be greatly varied without departing from the principle of my invention.

Claim. What I claim as my invention and desire to secure by letters patent, is my improved method of bending wood, substantially as hereinbefore described.

THOS. BLANCHARD.

Witnesses:
SAM. COOPER.
P. E. TESCHEMACHER.

Whereas, upon the petition of Thomas Blanchard, of Boston, Massachusetts, for the extention of the patent granted to him on
26 the 18th day of December, 1849, and reissued on the 15th day of November, 1859, the undersigned, in accordance with the 18th section of the act of Congress, approved the 4th day of July, 1836, entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," and the act approved the 27th day of May, 1848, entitled "An act to provide additional examiners in the Patent Office, and for other purposes," did, on this 17th day of December, 1863, decide that said patent ought to be extended. Now, therefore, I, David P. Holloway, Commissioner of Patents, by virtue of the power vested in me by said acts of Congress, do renew and extend the said patent, and certify that the same is hereby extended for the term of seven years from and after the expiration of the first term, viz: from the 18th day of December, 1863, which certificate being duly entered of record in the Patent Office, the said patent has now the same effect in law as though the same had been originally granted for the term of twenty-one years.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed this 17th day of December, 1863, and of the independence of the United States the eighty-eighth.

[SEAL.] D. P. HOLLOWAY,
Commissioner.

27 The U. States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of letters patent issued to Thomas Blanchard on the eighteenth day of December, eighteen hundred and forty-nine.

In testimony whereof, I, Charles Mason, Commissioner of Patents, have caused the seal of the Patent Office to be herewith affixed this third day of May, in the year of our Lord one thousand eight hundred and fifty-six, and of the independence of the United States the eightieth.

[SEAL.] C. MASON.

No. 6,951.

THE UNITED STATES OF AMERICA:

To all to whom these letters patent shall come:

Whereas Thomas Blanchard, of Boston, Mass., has alleged
28 that he has invented a new and useful improvement in bending wood, which he states has not been known or used before

his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose. These are therefore to grant, according to law, to the said Thomas Blanchard, his heirs, administrators, or assigns, for the term of fourteen years from the eighteenth day of December, one thousand eight hundred and forty-nine, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Blanchard, in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made
29 patent, and the seal of the Patent Office has been hereunto affixed. Given under my hand, at the city of Washington, this eighteenth day of December, in the year of our Lord one thousand eight hundred and forty-nine, and of the independence of the United States of America the seventy-fourth.

[L. S.]

T. EWING,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

THOS. EWBANK,
Commissioner of Patents.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Thomas Blanchard, of the city of Boston, in the county of Suffolk, and State of Massachusetts, have invented a new and useful improvement, being a method of bending timber, and other fibrous substances; and I do hereby declare that the following specification and drawing making part of the same is a full description of my new mode or method of accomplishing the said object, which I have exemplified in one form of machinery for bending plough-handles. Other articles will require different forms and different arrangements of machinery. Fig. 1st is a top view of the machine, with the mould lever brought home to its place after the
30 operation of bending is completed. Fig. 2d is a top view with the mould lever thrown open to receive the timber for the operation. Fig. 3rd is a sectional side view of the sliding beam E and bench A. Fig. 4th is a transverse section and end view of fig. first. Fig. 5th is another transverse end view section of figure first. The same letters apply to all the figures. A A is the bed piece or bench on which the machine is formed, and may be made of

wood or metal. B is the mould that gives the curve to the inside of the handle turning on a pin or fulcrum C, the other end extending back of sufficient length to form a lever of sufficient power to bend the handle when brought round one quarter of a circle, more or less, as is required. D is the chain with hollow links that forms the outside of the handle, and extends the whole length of the curve part of the handle, and is connected at one end to a sliding bar J on one side of the mould lever B; the other end of the said chain is connected by two straps F parallel with each other (only one of them is shown in the drawing) the whole length of the handle, and made fast to the sliding beam E by a joint at R, and of sufficient distance apart for the handle G to lay between them; each strap is connected by a pin to the last link of the chain; one on each side of said link
31 H is the upsetting screw passing through the end of the sliding beam E, and comes in contact with the end of the handle, and is for the purpose of upsetting the handle and preventing the fibres on the outside from separating while bending; I is a draft screw placed in the mould lever, and extending forward in a parallel line with the mould lever, and enters a female screw at one end of a sliding bar J on one side of the mould lever; the other end of said bar is connected to the opposite end of the chain from the one beforementioned. This screw serves to gripe the top end of the handle, and hold it fast between the first link of the chain and the mould D, and allows various sizes of handles to enter the same mould, and is brought to its bearing before the bending of the handle commences. K is a set screw passing through a stationary flanch on one side of the bench, and serves to press one end of the sliding beam E against the back or outside of the chain at the bending point, and keeps the chain and sliding beam at a sufficient distance from the mould lever sufficient to allow the timber or handle to lay between them. O is a clamp made fast to the top of the flanch by two screws, one end of which is a hook, falling into a groove on the top of the sliding beam, and serves to keep that end of the sliding beam in its place, but allows it to slide freely. C is the fulcrum or pin on which the
32 mould lever turns. This pin is supported on top of the lever by a brace M, through which it passes into the bench; the other end of said brace extends across the bench over the sliding beam, and is made fast to the stationary flanch; a part of the bench L is a key or wedge to hold the timber firm in its bed in the sliding beam, and prevents its springing sideways, while the upsetting and bending process is performed. N is a spring catch made fast at one end to the bench, the other end having a hook to hold the mould lever when the operation of bending is performed, as shown in fig. first. The mode of operation is as follows: The mould lever is thrown open at right angles with the bench as shown in fig. 2d. The timber or handle G is placed in the round end extending forward between the chain and the mould, the other end extending back to the upsetting screw; the key L is then driven in (see fig. 5th) to hold it in its place, but still allow it to slide in end sufficient to upset; the draught screw I is then turned to bring the end of the handle and

end of the chain firm against the mould; the set screw K is then turned up to bring the beam E against the back of the chain to give it proper support; the tender then applies his hand to the upsetting screw H and turns it forward, and presses the handle end-ways, driving the upper end firm against the slide J, which is connected with the first link of the chain, which operation straightens the chain to it, and completes the preperations ready for the bend-
33 ing process; power is then applied to the end of the mould lever and brought round, which draws the sliding beam forward with the handle as the curve is formed; the upsetting screw follows with the handle and sliding beam, and prevents the outside of the timber at the curve from parting or breaking. During the operation the upsetting screw should be relaxed a little, to prevent the timber on the inside of the curve from crippling or overlapping when the mould lever is brought home to its place; the spring catch takes hold of the end of the lever, and prevents it from going back, and the work is completed. That part of the plough handle which is bent is of an oval form, and is turned or wrought in proper shape before it is bent; it is formed deepest or thickest transversely to the curve; consequently the links or blocks that forms the chain are hollow, to conform to the outside of the curve, and the lever mould having a corresponding hollow to fit the inside. The chain may be dispensed with in bending large curves with flat sides, such as felloes for wheels where the sides having flat surfaces. A metallic strap of metal may be substituted, and a number of pieces can be put to the operation of bending at once in the same mould; or a whole plank of suitable thickness may be bent at once, and sawed into felloes afterwards; in that case there would be no side twist or wind-
ing in the operation of bending, but if they are sawed into
34 squares before bent the wind or side crook may be prevented by placing a number together, and prevent the side spring by side clamps to keep them in the right direction while they are bent. These side clamps may extend around the mould, which will prevent the side movement while receiving the proper curve. A cylinder or drum may be used for a mould, formed cylindrical or elliptical, or any figure required; and, instead of a lever to move it, cog-wheels may be used, and any power applied. The upsetting power must be given by the screw or other mechanical power when the timber is first placed in the mould, while in its straight form, by screwing or pressing against the ends of the timber. Care should be taken to prevent its cripling, by having clamps attached to the sliding bed. As soon as the bending process commences, the end pressure or upsetting screw must begin to relax in proportion to the thickness of the timber and shortness of the arc of the curve required, also in proportion to the toughness or tenderness of the timber; but no definite rule can be given, experience only can determine. In all cases the end pressure must be kept sufficiently tight, so as to prevent the outside of the curve from parting or breaking while the inside of the curve the timber will be upset. This relaxation of the end pressure must be continued until the work is done.

There are many mechanical methods by which the relaxation
35 of the end pressure can be made self-acting and uniform; one of which is as follows: on the end of the upsetting screw H may be attached a bevel tooth wheel mashing into another bevel wheel at one end of a shaft at right angles with the upsetting screw; on the other end of the shaft may be attached a spur wheel mashing into a stationary rack as the sliding bed advances in the operation of bending; the spur wheel, mashing into the stationary rack, will turn the bevel gears and the upsetting screw H in a backward direction, thus relaxing the pressure against the end of the timber uniformly during the whole operation. To vary the speed of the relaxing screw for the various curves and thicknesses of timber to be bent, a number of spur wheels of different sizes may be placed on the shaft, so that either of them can mash into the rack at pleasure, which will vary the speed as required on the outside of the bevel wheel on the upsetting screw. Instead of a thumb-piece for it, as shown in the drawing, a crank may be substituted, which would be preferable in heavy work, to throw the screw forward with sufficient power. The
36 bevel wheel on the screw shaft H may be connected with it by a rachet wheel and pall, so that the screw can be driven forward when the timber is first placed in the sliding bed, by turning the crank, without revolving the gear work, and when it is reversed by the gear, the pall will take hold the ratched wheel, which is made fast to the screw shaft. I do not claim as my invention the mechanical powers by which the operation of bending timber is effected, nor any particular form of machinery to carry my new method into operation; but the machine herein described is a form which I have adopted to carry out and combine my new method of bending timber. But what I do claim, is my method of bending fibrous materials by means of the upsetting movements, or the upsetting and relaxing movements combined, as exemplified in the screw H, whether such movement or movements be produced by means of the screw, wedge, comb, lever, rack and pinions, or any other equivalent means.

THOS. BLANCHARD.

Witnesses,
EDWARD F. HALL,
DUDLEY F. BARGLEY.

37 *Exhibit "C."*

Exhibit "C," referred to in said bill of exceptions, and made a part thereof, is in the words and figures following, to wit:

Reissue, No. 1312.

The United States of America to all to whom these letters patent shall come:

Whereas, John C. Morris, of Cincinnati, Ohio, has alleged that he has invented a new and useful improvement in wood-bending machines, (for which letters patent were issued to him, dated March 11,

1856, which letters having been surrendered by him, the same have been cancelled, and new letters ordered to issue to him, on amended specification,) which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are, therefore, to grant, according to law, to the said John C. Morris, his heirs, administrators or assigns, for the term of fourteen years from the eleventh day of March, one thousand eight hundred and fifty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said John C. Morris in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-seventh day of May, in the year of our Lord one thousand eight hundred and sixty-two, and of the independence of the United States of America the eighty-sixth.

[SEAL.] CALEB B. SMITH,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
D. P. HOLLOWAY,
Commissioner of Patents.

The schedule referred to in these letters patent, and making part of the same.

To all to whom it may concern:

Be it known that I, John C. Morris, of the city of Cincinnati, Hamilton county, Ohio, have invented certain new and useful improvements in machines for bending wood for wagon-fellies, ship timber, plough-handles, chair stuff, and for all other purposes for which bent wood is required; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the acccompanying drawings, forming part of the specification, and to the letters of reference marked thereon. Similar letters refer to corresponding parts. The machines for bending wood may be divided into two principal groups or classes. The first, including all machines in which the bending proceess commences at one end of the wood, and is continued in the direction of the other; and the second, including those in which the form or mould is first applied, at or near the centre of the piece to be bent, and the bending process is continued from that point towards each end, which I

call bending outward. I regard machines of the latter class as superior, from the fact that the change of the fibre of the wood, in the act of bending, goes on from the centre toward the ends in two directions, equalizing the strain and distributing the compressed fibre more evenly throughout the curve. My improvements relate to this second class of machines. In my original patent, of which this is a reissue, reference was made to a previous use of levers "for bringing the piece to the required shape, by connecting said levers with a strap at each end, the strap being placed at the back of the piece required to be bent, and than drawing the ends of the levers together, which bends the piece around the form." This reference was solely to a use of such a method which had been made by myself
38 within less than two years previous to the application for my original patent. My improvements consist of devices tending to adopt the machines of the second class, as stated above, to the performance of good work, in an expeditious manner, and with the least loss of material. They are applicable to bending wood to be used for any purpose, such as ship timber, wheel-fellies, plough-handles, chair stuff, and other articles. In some cases, as for bending plough-handles, but one lever will be required, when the bending process will begin at the inner end of the curve, next to the portion of the piece left unbent, and will extend towards the outer end, bending the wood, first in a larger curve, and gradually reducing it to a smaller, until it conforms to the curvature of the mould. In bending wood around a form, the outer fibers are stretched, while the inner ones are compressed; but, while wood may be greatly compressed without injury, comparatively little stretching or expansion will break the fibres of the outer curve. To prevent undue expansion, it is necessary to confine the wood between abutments, placed at the ends, so as to counteract end expansion, by what is called in the art "end pressure." These abutments or clamps may wholly prevent end expansion, or may prevent it before or after a certain degree of pressure is reached in the process of bending. To enable others skilled in the art to make and use my improvements, I will proceed to describe its construction and operation by referring directly to the accompanying drawings: Fig. A represents a top view of the horizontal or vertical platform, to which the bending apparatus is attached. Fig. B is a side elevation of the same, when used horizontally. Figs. C and D are two views of the bending strap and abutments or clamps to be applied to the back and ends of the piece to be bent. Figs. E and F exhibit the improvements, as applied to the bending of plough-handles and boat or ship timber, or when one lever only is used. *a a* represent the platform on which the form *b* rests. This form may be held in its place by pins *c c*,
39 or it may be poised upon a single pin, as at *d*, fig. E, or upon either or all of pins *e e e e e e*, so as to vary the points of support and permit the form to adapt itself to the wood under varying circumstances. The form is made of the shape in which it is desired that the piece shall be bent. The form *b* is of a shape suitable for bending wagon-fellies; *f* represents the felly or bent wood; *g* is an

iron or steel band or bending strap; *h h* are clamps or abutments to be applied at opposite ends of the piece to be bent. They are attached by pins *i i* projecting from them, and made to pass through the ends of the strap in fig. A, by the stirrup p in fig. E, and directly to the lever in fig. F. If all end expansion is to be prevented, the piece before bending is made to fit with substantial accuracy the space between the clamps. If it is desired to permit a slight degree of expansion, the wood may be cut a little shorter than the space between the clamps, and allowed to expand as it is bent, until it fills the space; *k k* are levers or handles for the purpose of guiding the bending operation; they may work upon the fulcrums m^1 m^2 m^3 m^4, or their equivalents. These handles or levers support the clamps, and serve to draw them with the strap and piece to be bent around the form or mould. They are operated by the cords *n n* and drum *o*. When the levers are thus used, the clamps or abutments connected to the strap *g* are adjusted so as to slide upon the sides of the levers, to allow the piece to be bent to accommodate itself to the form. Another mode of using the handles is to dispense with the fulcrum pins, so that, in the operation of bending, while the power is applied as before to the end of the handle, and the resistance is the unbent wood, the point of support is no longer fixed, but shifting, being found in the bending strap or point of contact of the strap and wood with the mould. In this method, which was that originally used by me, the abutments do not slide upon the handles, but may be made a part thereof, or attached thereto. The principal advantage of the fixed fulcrum is that it prevents the wood from twisting in the process of blending by reason of one side of the wood, or one of two pieces bent at the same time, being harder than the other. In such cases, without some rigid point of support preventing the levers from twisting or turning, it is difficult to make true work; *p p* are tongue-pins attached or cast to the back of the abutments, which, when the latter are allowed to slide on the handles, work in grooves, to prevent the clamps from slipping, laterally or otherwise, becoming deranged from their proper relative position during the bending operation; *q*, fig. A, is an eccentric, and *r r r*, fig. F, are pins or studs for bringing the wood and strap in close relation with the form when the bending commences, and for the purpose of confining that portion of the curve while the piece is gradually made to conform to the mould through the operation of the drum, cords, and handles. Two or more pieces may be bent at the same time by laying them together, as shown in fig. G, and placing them in the machine. For the heavier kinds of bending, the band and other parts must be of increased strength. One of the modes of increasing the strength of a band is to double it, putting the stirrup or clevis, as shown in fig. F, in the loop. In fig. E the improvements are applied to bending timber for boat and ship building, a knee for a hull being shown in the diagram. One end of the timber is held between studs, while the other is bent from the point where the curve merges into the straight part, outward to the other end, by means of the handle supporting the abutment. But one lever and

clamp are used for this purpose, or in bending plough-handles, as shown in fig. F. In the latter drawing no means of holding the piece in contact with the form at the commencement of the process is shown; but the eccentric *q*, stud *r*, wedge-screw, or any suitable means must be employed for that purpose. In the use of the centre bending process, shown in fig. A, as the piece is laid against
41 the strap, and between the clamps, hooks *s s* provided with the pin-holes are placed so as to embrace the ends of the piece. After it is bent to the form, pins *t t* are inserted in the holes, thus securing the bent piece to the form. The straps and clamps are then removed from the felly; the form, with the bent piece, is taken from the platform, held between two pieces of timber, so that the catch-hooks and pins may be removed when a strip of wood is nailed across to prevent the ends of the piece from spreading. The form is then removed and replaced for bending another piece.

Having thus fully described my improvements, I do not wish to be understood as claiming them in connection with machines for bending wood, where the bending is effected by the rotation of the form; but what I claim therein as new, and desire to secure by letters patent is—

I. A wood-bending form, to which timbers are made to conform by bending them from the centre or inner end of the desired curve outward, when used in combination with abutments or clamps to prevent or regulate end expansion, and levers or handles, or their equivalents, to guide the bending, substantially as described.

II. A stationary or poised wood-bending form, in combination with the cords, levers, and drum, or their equivalents, and the eccentric clamp, or its equivalent, in the manner and for the purposes set forth.

III. In combination with the stationary form, levers, and abutments, I claim the employment of hooks, or hooks and pins, or their equivalents, that shall embrace the ends of the wood, to restrain the wood in shape and permit the removal of the abutments after the completion of each operation.

JOHN C. MORRIS.

Witnesses:
J. F. BALDWIN.
JOHN CRESMAN.

(Here follows drawing marked page 41.)

Exhibit "C."

Exhibit "C," referred to in said bill of exceptions, and made a part thereof, is in the words and figures following, to wit:

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss:

Be it remembered, that on this tenth day of March, in the
42 year of our Lord one thousand eight hundred and sixty-six, I, R. E. Stillell, a commissioner duly appointed by the Circuit Court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress, entitled "An act for the more convenient taking of affidavits and bail in civil causes, depending in the courts of the United States," passed February 20th, 1812, and the act of Congress, entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes, depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, United States Court Buildings, No. 41 Chambers street, in the city of New York, in the said southern district of New York, in the State aforesaid, Edward S. Renwick, to testify and the truth to say, on the part and behalf of the plaintiff in a certain suit or matter of controversy, now depending and undetermined in the Circuit Court of the United States for the southern district of Ohio, wherein John C. Morris is plaintiff and Roger Coleman and Young are defendants; and the said Edward S. Renwick being about the age of 43 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Edward S. Renwick, and he did thereupon depose, testify, and say as follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. Edward S. Renwick; 43 years of age; reside in the city of New York. I am occupied principally in soliciting patents and acting as expert in the trial of patent causes.

Q. 2. State if you have examined the letters patent for an improvement in wood-bending machine granted to John C.
43 Morris, March 11, 1856, and reissued to him May 27, 1862; and if yea, if you understand the improvements therein described and specified.

A. I have examined the letters patent referred to in the question, and believe that I understand the improvements therein described and specified.

Q. 3. Please examine the model marked X, and state how far, if at all, said model contains the improvement, or either of them, described and specified in said reissued letters patent, and give your reason for any opinion you may express.

A. I have examined the model referred to in the question which, as presented to me, comprises the curved form of the shape in which it is desired the pieces should be bent, with appliances to hold the wood to the form, two straps for encircling the outer side of the wood to be bent, and a lever-handle, which is connected with said straps in the operation of bending the wood. The said model represents a machine which would embody the improvements recited in the first and third claims of the said reissued letters patent of John C. Morris. A machine like model X would, in my opinion, embody the improvement recited in the first claim of said letters patent for the following reasons: The said improvement, as I understand it, consists of a combination of three machines, which are—First, a bending form made of the shape in which it is desired the piece should be bent, and which remains stationary with reference to the piece that is bent during the operation of bending; the piece to be bent being gradually caused to apply itself to the curve of the bending form. The second member of the combination consists of abutments, or clamps, which are connected together and prevent the piece being bent from extending in length beyond a predeternined limit. The third member of the combination consists of one or more levers or handles, which are applied to the piece to be bent,
44 and by which the piece is caused to apply itself to the bending form progressively. A machine like the model, Exhibit X, contains a combination of three members, which are substantially the same as the three above-mentioned, as constituting the combination recited in the first claim of the reissued letters patent. The bending form of the model differs in shape from each of the bending forms represented in the drawings of the patent; but as I understand said invention, it is not limited to any particular shape of the bending form, provided the shape be that in which it is desired the piece should be bent, and the bending form of the model is of that shape. The bending form of the model is also substantially like that described in the said patent, and constituting a member of the combination recited in the first claim, in the respect that it remains stationary with reference to the piece to be bent, and the said piece is caused to apply itself gradually to the bending form. One of the abutments (or clamps as they are called in the specification) in the model is the square shoulder formed upon the lever handle; the other clamp operating as a second abutment is formed by the hangers, pin, and wedge at the flat side of the bending form, which clamp is also employed to secure the piece to be bent rididly to the form before bending is commenced. The abutment of the lever-handle and the clamp of the model are connected together as described in the said letters patent, by means of a metallic strap, into the end of which the lever-handle is hooked when bending is being effected, and as the said strap in the model is rigidly clamped to the wood, the abutment at the lever-handle prevents the end of the piece from extending in length, precisely as described in the said letters patent. I am aware that the abutment which restrains the end of the piece being bent is rigidly connected in the model with the lever-handle in-

45 stead of sliding thereon, as is represented in figures A and E of the patent, but such a rigid connection is described in the patent as an alternative mode of construction, and an example of it is given in figure F, of the drawings. The lever-handle in the model is operated without a fixed fulcrum, and in this respect varies from the levers represented in the drawing; but this variation does not, in my opinion, make the lever-handle of the model substantially different from the lever-handle which constitutes a member of the combination above refered to, because the former operates substantially in the same manner as the latter, and is combined with the other two members of the combination substantially in the same manner as the latter, and because the patent provides for the operation of a lever without a fixed fulcrum as an alternative mode of construction. The model, as presented to me, is provided with but one lever-handle, and in that respect it is like the two machines represented in the drawings at figures E and F, which are stated in the patent to exhibit the improvements set forth therein, thereby indicating to my mind that a combination having but one lever-handle contains the improvements specified in the patent, if it also contained the other members recited in the claims. A machine constructed like the model X, would, in my opinion, embody the combination recited in the third claim of the said reissued letters patent, because that combination is composed of the stationary form, abutments or clamps, and lever or levers, (which compose the combination recited in the first claim,) combined with hooks to embrace the ends of the wood and hold it to the bending form after it is bent, thereby restraining the wood in shape and permitting of the removal of the abutments or clamps; and because the model X contains such hooks, combined with a bending form, abutments, or clamps
46 and lever, which, as before stated, are substantially like those described in the patent. The hooks to which I refer in the model are those at the hinder side of the bending form. The model, as presented me, is, as I stated before, provided with but one lever-handle, but provision is made to apply it to each end of the strap on the outer side of the piece to be bent, so that the two ends of the piece are bent in succession; the end first bent being confined to the bending form by the appropriate hook, while the lever, with its abutment, is removed and applied to the other end of the piece, so that the model represents a centre bending machine in which both of the ends of the timber are bent outwardly, or from the centre towards the end, as described in the patent; and this bending of the two ends may be performed successively by the use of a single lever-handle; or if two lever handles be provided, both ends of the piece may be bent immediately.

Q. 4. Have you examined the letters patent granted to Thomas Blanchard for "improvement in bending wood," granted December 18th, 1849, and reissued November 15th, 1859, and do you understand the improvements therein described and specified? If yea, please compare said improvements with those specified in the first, second, and third claims of the reissue to John C. Morris, and stato

how far the latter are anticipated by anything you find in Blanchard's patent?

A. I have examined a certified Patent Office copy of the reissued letters patent granted to Thomas Blanchard, referred to in the question, and believe that I understand the improvements therein described and specified. I have compared them with the improvement specified in the first, second, and third claims of the reissued letters patent of John C. Morris, before referred to, and I find that the improvements specified in the claims of the said Morris patent
47 are not anticipated by anything that is described or specified in the said Blanchard patent; but that, on the contrary, the improvements described and specified in the Blanchard patent are substantially different from those described and specified in the Morris patent; first, in the respect that the bending form of the Blanchard patent does not remain stationary with reference to the piece that is bent during the operation of bending, but is, on the contrary, rotated upon that piece; also in the respect that the piece to be bent by the Blanchard machine is caused to appy itself directly to the curve of the bending form instead of being gradually approximated to that curve as is the case in the machinery of Morris. The machinery described in the Blanchard patent also differs substantially from the Morris machinery, in the respect that in the Blanchard machinery the lever or handle is applied to the bending form instead of being applied to the piece to be bent as the lever of the Morris combination is. The mode of operation of the Blanchard machinery differs substantially from that of the Morris combination, in the respect that by the former the bending is effected from the end of the piece inwards towards the centre thereof, while by the Morris combination the bending may be effected from the centre outwards towards the end of the piece. Moreover, the machinery described in the said Blanchard patent differs substantially from the improvements recited in the second and third claims of the said Morris patent, in the respect that the former does not describe or suggest the employment of the cords, bands, and drum, or their equivalents, which form the members of the combination recited in the second claim of the Morris patent, nor the employment of hooks, (or any equivalent therefor,) which constitutes members of the combination recited in the
48 third claim of the Morris patent.

Q. 5. Please examine model of wood-bending machine marked G, now shown you, and make the same comparison with the improvements described in the said Morris patent.

A. I have examined the model referred to in the question, and I find that it is substantially different from the improvements recited in the claims of the Morris patent, in the respects that it represents substantially a Blanchard machine, having a rotating bending form and a lever combined therewith, which differ from the Morris improvements in the same respect as those of the Blanchard machinery before described. The model is provided with a hook to confine the bent piece to the bending form, but the combination of such hook with a rotating bending form and lever applied thereto, and abutments or

clamps, is substantially different from the combination of the stationary bending form and lever applied to the piece and abutments recited in the third claim of the Morris patent, because the members of the two combinations are combined together and operate substantially in different modes.

Q. 6. Please look at the drawing marked Exhibit "J. W. G." 1 (copy,) (here follows drawing marked page 248,) and make the same comparison of the machine shown therein, with the improvements described in the Morris patent?

A. I have examined the drawing referred to in the question, and I understand it; it represents a machine which may be called a duplex Blanchard machine, because it has two rotating forms, each of which operates precisely in the manner of the rotating forms described in the Blanchard patent, the two forms being connected by a pivot marked D, in the drawing, so that they both operate upon the same piece of timber. Such a machine is substantially different from the improvements recited in the claims of the Morris patent in the
49 same respect that the machinery described in the Blanchard patent differs from the said Morris improvements. The machine described in the drawing has, as I perceive, cords and a drum; but as those are combined with other members, which differ substantially in their construction, combination, and operation from the members which form part of the combination recited in the second claim of the Morris patent, the machine represented in the drawing does not embody the said recited combination.

Q. 7. Please make the same comparison with model No. 4, now shown you.

A. I have examined the model refered to in the question. It represents a machine which differs substantially from the combination recited in the first and third claim of the said Morris patent, in the respect that it has no abutments, or any equivalent therefor, to prevent the wood from extending when it is bent. A machine like the said model would also differ substantially from the combination recited in the second claim of Morris patent, in the respect that the former would not contain any cords, lever, and drum, or their equivalents, such as form part of the combinations recited in the second part of said Morris claim.

Q. 8. Please look at the drawing marked E. S. R. 1, and make the same comparison with reference to the machine illustrated therein.

A. I have examined the said drawing and compared it with the description in the Morris patent. In my opinion, a machine constructed like said drawing would differ substantially from the combinations recited in the first and third claims of the Morris patent, in the respect that such a machine would not contain any lever such as forms an essential member of the said recited combinations for the purpose of applying a piece to be bent to the bending form.
50 Such a machine would also differ substantially from the combination recited in the second claim of the Morris patent, in the

respect that the said machine would not have any cords, levers, and drum, or any equivalents therefor.

E. S. RENWICK.

Subscribed and sworn to before me this 10th March, 1866.

R. E. SHELWELL,
U. S. Com'r.

[Five cent stamp.]

UNITED STATES OF AMERICA, *Southern District of New York, ss:*

I, R. E. Shewell, a commissioner duly appointed by the Circuit Court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress, entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress, entitled "An act in addition to an act for the more convenient taking of affidavits and bail in civil causes, depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, do hereby certify that the reason for taking the foregoing deposition is, and the fact is, the witness is material and necessary in the cause in the caption of the said deposition named, and that he resides in the city of New York, at a greater distance than one hundred miles from the place of trial. I further certify that notification of the time and place of taking the said deposition signed by me was made out and served on the , to be present at the taking of the said deposition, and to put interrogatories, if he or they might think fit. I further certify that on the tenth day of March, in the year of our Lord one thousand eight hundred and sixty-six, I was attended by S. S. Fisher, esq., counsel for pl'ff, and by the witness, who was of sound mind and lawful age, and the witness was by me first carefully examined and cautioned and sworn to testify
51 the truth, the whole truth, and nothing but the truth, and the deposition was by me reduced to writing in the presence of the witness; and from his statements, and after carefully examining, reading the same to the witness, he subscribed the same in my presence. I have retained the said deposition in my possession for the purpose of mailing the same to the court for which the same was taken. And I do further certify that I am not of counsel nor attorney for either of the parties in the said deposition and caption named, nor in any way interested in the event of the cause named in said caption.

In testimony whereof, I have hereunto set my hand and seal this tenth day of March, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the ninetieth.

[SEAL.] R. E. SHEWELL,
United States Commissioner duly appointed by the Circuit Court of the United States for the Southern District of New York in the Second Circuit.

[5-ct. st'p.]

UNITED STATES OF AMERICA, *Southern District of New York, ss:*

I, Kenneth G. White, clerk of the Circuit Court of the United States of America for the southern district of New York, second circuit, do hereby certify that I am well acquainted with the handwriting of R. E. Shewell, whose name is subscribed to the annexed certificate, and that the signature to the same is in his proper handwriting. And I do further certify that he was, at the time of signing the same, a United States commissioner, duly appointed by the Circuit Court of the United States of America for the southern district of New York, second circuit.

In testimony whereof, I have hereunto subscribed my name and affixed the seal of the said Circuit Court, this tenth day of March, in the year of our Lord one thousand eight hundred and sixty-
52 six, and of the independence of these United States the ninetieth.

[SEAL.] KENNETH G. WHITE, *Clerk.*

[5-c. st'p.]

Exhibit "D."

Exhibit "D" referred to ie said bill of exception, and made a part thereof, is in the words and figures following, to wit:

United States Circuit Court, southern district of Ohio.

JOHN C. MORRIS
vs.
ROYER, COLEMAN & YOUNG. } In equity.

UNITED STATES OF AMERICA, *Southern District of New York, ss:*

Samuel S. Fisher, being duly sworn, says: I am the solicitor of the complainant. I left Cincinnati last week under a verbal understanding with Mr. Lee, the defendant's solicitor, that testimony should be taken in the above case in New York and Boston without notice, and that each party should wait on the other; Mr. Lee stating that he should probably delay me two or three days in New York. Testimony was taken at Boston on behalf of the defendants under this understanding, and after some delay we arrived in New York on Thursday morning. Mr. Lee examined six witnesses in other cases, and finished on Friday at half-past one p. m. I then notified him verbally that I should examine Mr. Renwick on to-day, Saturday, and finish during the day. He declined to remain, saying I might take the deposition ex parte; that he did not care to remain for the sake of the cross-examination. This testimony is, therefore, taken ex parte, the witness Renwick residing within my knowledge more than one hundred miles from Cincinnati, and neither the defendants, nor their solicitor or counsel being, as I verily believe, within one hundred miles of the city of New York.

SAM'L S. FISHER.

Sworn to before me and subscribed in my presence this 10th day of March, 1866.

R. E. SHEWELL, *U. S. Com.*

[5 c. st'p.]

Exhibit "E."

Exhibit "E," referred to in said bill of exceptions, and made a part thereof, is in the words and figures following, to wit:

U. S. Cir. Court.

A. V. BLANCHARD & Co.
vs.
ANTOINE PUTTMAN *et al.*

Geo. M. Lee being sworn, says that in March, 1866, he went
53 east to New York and Boston in company with J. S. Fisher, esq., to take depositions in four separate cases pending in the U. S. Courts, to wit: Blanchard *vs.* Puttman, Morris *vs.* Royer, Hoole *vs.* Murdock and Spencer, and Darke *vs.* Kendall, at Chicago. Depositions were taken in Boston, Mr. Lee representing one side in said cases and Mr. Fisher the other, and as counsel for the various parties said Lee and Fisher made the written agreement hereto attached. Affiant and said Fisher reached N. York about March 7th or 8th, 1866, and remained two or three days, and during that time took dep's in the Hoole case; and Mr. Fisher said he would also take E. S. Renwick's deposition in Morris *vs.* Royer. Affiant waited in New York two or three days for him to take said Renwick's dep's, in all which time he would have consented to taking the dep's, but said Fisher declined, and delayed to take it, saying Renwick was not yet ready to swear. On the morning of March 9th, affiant urged said Fisher to take Renwick's deposition, but he declined to do so, and did not or would tell affiant when he would take the deposition, only saying he would take it as soon as he could get Renwick ready to swear. Affiant, about 11 p. m., on March 9th, offered to go and take Renwick's dep's, and told Fisher he, affiant, was obliged by business and personal engagements to go home that evening; that there was plenty of time on March 9th to have taken Renwick's deposition, as affiants train west did not go till some time in the afternoon. Affiant went to Renwick's office on said day of his departure, and staid nearly all the afternoon, till his train-time nearly arrived. Messrs. Fisher and Renwick were in a back room of same office, but Renwick told affiant he was not ready to swear that day. Affiant, not knowing when Renwick would be ready, or whether ever, thought he had waited long enough
54 and left for. He does not understand that this deps. can be read under the agreement. G. M. LEE.

Sworn to and subscribed before me.

JOHN McLEAN, *Clerk.*

Exhibit "F."

Exhibit "F," referred to in said bill of exceptions and made a part thereof, is in the words and figures following, to wit:

United States Circuit Court, southern district of Ohio.

JOHN C. MORRIS
vs.
ROYER, COLEMAN, AND YOUNG. } In equity.

It is agreed that any testimony properly taken in the above case in the cities of Boston or New York, by either party, may be read in evidence; also in the law case of A. V. Blanchard *et al. vs.* Antonie Puttman *et al.*, in said court, by either party.

SAM'L S. FISHER,
Sol'r for Compl't, and Att'y for Puttman et al.
G. M. LEE,
Sol'r for Dep's, and Att'y for Blanchard et al.

55 *Exhibit "G."*

Exhibit "G," referred to in said bill of exceptions and made a party thereof, is in the words and figures following, to wit:

The U. States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted E. Reynolds July 17th, 1835.

In testimony whereof, I, T. C. Theaker, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this eleventh day of April, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the ninetieth.

[SEAL.] T. C. THEAKER.

The United States of America to all to whom these letters patent shall come:

Whereas Edward Reynolds, a citizen of the United States, hath alleged that he has invented a new and useful improvement in a machine for bending or setting felloes for the wheels of carriages and waggons, which improvement, he states, has not been known or used before his application; hath affirmed that he does verily believe that he is the true inventor or discoverer of the said improvement; hath paid into the Treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are, therefore, to grant, according to law, to the said Edward Reynolds, his heirs, administrators or assigns, for the term of fourteen years, from the seventeenth day of July, one thousand eight hundred and thirty-five, the full and exclusive right

and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Edward Reynolds himself, in the the schedule
56 hereto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to made patent and the seal of the United States to be hereunto affixed. Given under my hand, at the city of Washington, this seventeenth day of July, in the year of our Lord one thousand eight hundred and thirty-five and of the independence of the United States of America the sixtieth.

[SEAL] ANDREW JACKSON.

By the President:

JOHN FORSYTH, *Secretary of State.*

CITY OF WASHINGTON, *to wit*:

I do hereby certify that the foregoing letters patent were delivered to me on the seventeenth day of July, in the year of our Lord one thousand eight hundred and thirty-five, to be examined; that I have examined the same and find them conformable to law, and I do hereby return the same to the Secretary of State within fifteen days from the date aforesaid, to wit, on this twenty-fifth day of July, in the year aforesaid.

B. F. BUTLER,
Attorney General of the United States.

Edward Reynolds, of Haddonfield, New Jersey, Letters Patent.

The schedule referred to in these letters patent, and making part of the same, containing a description in the words of the said Edward Reynolds, himself, of his improvement in a machine for bending or setting felloes for the wheels of carriages and waggons.

To all whom it may concern:

Be it known that I, Edward Reynolds, of Haddonfield, in the county of Glouscester, and State of New Jersey, have invented a new and useful machine for bending or setting fellows for the wheels of carriages and waggons of all descriptions, and that the following is a full and exact description thereof:

The felloes are to be semicircles, or nearly so, its being intended generally that two or them should form the rim of a wheel. The timber either sawed or rived is to be bent round cylinders,
57 which cylinders may be somewhat less in diameter, say one-fourth or one-fifth, than that of the interior of the wheel. The bending machine is furnished with two such cylinders, one of them intended for the larger and the other for the smaller sized wheels. These I make of wood, of such thickness that for the lighter kind of wheels three may be bent thereon, side by side, at the same time. These cylinders are placed horizontally upon a stout bench, immovably fixed; each of the cylinders revolves on a strong bolt, forming its axis. One of these bolts is permanent fixed in the bench, the other passes at each end through a slit or mortise in the bench, and in a piece of timber placed above the cylinder to receive them. This is for the purpose of regulating the distance of the cylinders from each other, which should in all cases be equal to that of the thick-

ness of the timber to be bent. A regulating screw is made to operate upon each end of the sliding bolt, or rather against a sliding block which receives the bolt. It will be found convenient to remove a part of each of the cylinders, say one-fourth from the larger and one-sixth from the smaller, by cutting their circumference by a vertical section in a straight line, a sufficient portion of the cylinder being still left to effect the setting or bending. A hole is mortised in the middle of this straight part of each cylinder to receive a hand-spike by which to apply the requisite power When not so cut off, the mortise must be made in the edge of the cylinder. At one of the angles formed by the straight and curved part on each cylinder, an iron clevis is to be fixed to receive under it and confine one of the ends of the stuff which the fellows are to be formed, and holes are bored at suitable distance around the edges of the cylinders to
58 receive the bolt of a movable or shifting clevis which is used to confine the other end of the stuff after it has been set. The edges of the cylinders should be graduated or marked off in feet and inches in order to determine, with facility, the exact place at which they must stand when the process of bending is commenced, to cause the angle on the cylinder to come one or two inches short of the end of the felloe when bent, in order to afford sufficient room for the affixing of the shifting clevis.

When the machine is to be used the stuff to be bent is prepared by boiling or steaming in the usual manner. One of its ends is then placed under the stationary clevis, togather with a piece of hoop-iron, of proper length and width, which, as the stuff is bent, laps round its outer edge and prevents the formation of checks and splints; the other ends of these iron straps I sometimes make to terminate in a screw furnished with a nut, which may be passed through an iron plate on the edge of the cylinder, the strap may then be drawn firmly around the felloes, as shown in the model and drawing deposited in the Patent Office.

What I claim as my invention, and for what I ask a patent, is the machine or apparatus, as herein described, and may properly be denominated revolving cylinders, to be used for the bending of felloes for carriages and waggons of all descriptions, sleigh-runners, iron tires for wheels, cooper's sett-hoops, vessels mast, hoops, &c. In which machine two cylinders are employed, operating togather by means of certain accessory parts in the manner or upon the principals herein set forth, not intended, however, to limit myself in the formation of the accessory parts or to the specific use herein stated, but to vary these in any way and to apply them to any use not varying from the principle, as I may find convenient, whilst the machine con-
59 tinues substantially the same, and a similar effect is produced by analagous means.

EDWARD REYNOLDS.

Witnesses:
WILLIAM WATSON.
JOHN CLEMENT.

[Here follows drawing marked page 59.]

Exhibit "H." Patented, July 17, 1835.

Exhibit "H," referred to in said bill of exceptions and made a part thereof, is in the words and figures folowing, to wit:

The U. States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted. Jona. Milford, January 16th, 1835.

In testimony whereof, I, T. C. Theaker, Commissioner of Patents, have caused the seal of the patent office to be hereunto affixed this eleventh day of April, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the ninetieth.

[SEAL.] T. C. THEAKER.

The United States of America to all to whom these letters patent shall come:

Whereas Jonathan Mulford, a citizen of the United States, hath alleged that he has invented a new and useful improvement in a machine for bending mast and truss hoops, which improvement, he states, has not been known or used before his application; hath made oath that he does verily believe that he is the true inventor or discoverer of the said improvement; hath paid into the Treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are therefore to grant, according to law, to the said Jonathan Mulford, his heirs, administrators or assigns, for the term of fourteen years from the sixteenth day of January, one thousand eight hundred and thirty-five, the full and exclusive right and liberty
60 of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Jonathan Mulford himself in the schedule hereto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent and the seal of the United States to be hereunto affixed. Given under my hand, at the city of Washington, this sixteenth day of January, in the year of our Lord one thousand eight hundred and thirty-five, and of the independence of the United States of America the fifty-ninth.

[L. S.] ANDREW JACKSON.

By the President:

JOHN FORSYTH,
Secretary of State.

CITY OF WASHINGTON, *to wit*:

I do hereby certify that the foregoing letters patent were deliv ered to me on the sixteenth day of January, in the year of our Lord one thousand eight hundred and thirty-five, to be examined; that I have examined the same, and find them conformable to law; and I do hereby return the same to the Secretary of State, within fifteen days from the date aforesaid, to wit, on this sixteenth day of January, in the year aforesaid.

B. F. BUTLER,
Attorney General of the United States.

JONATHAN MULFORD,
Northern Liberties, Philadelphia, Penn.

Letters Patent.

The schedule referred to in these letters patent and making part of the same, containing a description in the words of the said Jonathan Mulford himself, of his improvement in a machine for bending mast and truss hoops.

To all to whom these presents shall come:

Be it known that I, Jonathan Mulford, of the district of the Northern Liberties, of the city of Philadelphia, and State of Pennsylvania, have invented a new and useful machine for bending mast and truss hoops, and that the following is a full and exact description of the construction and operation of the said machine as in-
61 vented by me, to wit: The frame to which the several parts of the machine are attached and on which they rest is formed of four pieces of timber, making an oblong square, and resting on four legs, about two feet in height; to this frame is attached, opposite to each other, two perpendicular pieces of timber on which the main shaft in passing through revolves; to the end of this shaft is attached a pulley or check on which the hoop is bent, the hoop-pole is secured on said pully or check by a wedge in the rim. as also by another shaft, regulated to the pressure required by a compound or double lever; this shaft is fixed above the main shaft and has a roller at the extremity, (immediately over said chuck,) which acts on the hoop-pole so as to keep it from slipping or departing from the rim of said chuck or pulley; the rotary motion of said main shaft is performed by a crank attached thereto with two cog wheels passing into each other, so that the hoop-pole, being secured on the circular chuck or pulley, and the main shaft being turned, the hoop-pole is bent into the form required; there is also attached to the frame on the same side as the pulley or chuck a frame with a roller fixed so as to form a guide for the hoop-pole in passing on to the chuck or pulley, the pole passing under the said roller on the pulley or chuck.

JONATHAN MULFORD.

Witnesses:
W. WILKINSON.
LEWIS D. BELAIR.

[Here follows drawing, marked page 61.]

Exhibit "I."

Exhibit "I," referred to in said bill of exceptions and made a part thereof, is in the words and figures following, to wit:

The U. States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the specification and drawing, with the application of H. H. May, for letters patent, filed Feb'y 18th, 1846.

In testimony whereof, I, T. C. Theaker, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto
62 affixed this eleventh day of April, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the ninetieth.

[SEAL.] T. C. THEAKER.

To all whom it may concern:

Be it remembered, that I, Hervey H. May, Galesbury, county of Knox and State of Illinois, have invented a new and useful method of bending plough-handles, wagon-thills, sleigh-runners, and other articles requiring an artificial form, by bending; and I do hereby declare that the following is a full and exact description:

The nature of my invention consists in an improved method of bending plough-handles, (and other articles requiring to be bent artificially,) by means of an elastic strap or band, each end of which is confined to the wood by a clamp, the band or strap pressing the outer bending surface of the wood, preventing it from splitting, checking, or breaking. To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, reference being had to the annexed drawings making a part of this specification. A represents a stock, over which a plough-handle is bent to give it the required form. B represents a notch in the stock A sufficient to receive the strap end of the loop or clamp G in bending a handle. C represents the circular portion of the stock over which the handle is bent. D represents an elastic strap or band extending the whole length of the portion of the timber required to be bent. One end of the strap is attached to the loop or clamp E. so as to slide in the loop and on the strap. Inside of the loop is fastened a bar or claw, to make an indentation in the wood sufficient to prevent the strap from slipping on the wood. The other end of the strap passes through loops F, and is either fastened to the stock or to the loop F, so as to slide the same at the other extremity in loop E. E represents the loop or clamp to which is at-
63 tached the moving end of the strap. F represents the loop or clamp fastened to the stock, through which loop the strap passes, or to which it may be attached. G represents a crank-screw passing through the end of loop E. A thread is cut in this end of

the loop, so that the strap is moved backwards or forwards as the screw is turned, the end or point of the screw being attached to the strap on which it revolves. The clamp E is now formed. H represents a crank-screw passing through the loop F, the point of the screw pressing the strap firmly against the wood required to be bent; or if the strap is not fastened to the stock, then the point of the screw is attached to the strap in the same manner as the opposite end is attached to the loop E. The clamp F is now formed. Wedges, or other mechanical equivalent, may be substituted for the screws in pressing the strap firmly against the wood. I represents a block of wood fastened to the stock to make it thick enough to receive the hook or elbow K. K represents an elbow or hook that revolves in the stock to hold the square part of the plough-handle. L represents a screw to lengthen or shorten the elbow or hook K. M represents a notch in the stock, on which the end of the plough-handle rests when put into the machine. N represents a block of wood with a notch, to hold the stock steadily on its lower edge, the elastic strap standing perpendicular bearing on its upper extremity the clamp E. The machine is now operated by taking a prepared handle, passing the round part through clamp E, resting the end on notch M, or the stock, and inside clamp F, and the square part of the handle being in clamp E. The screws G and H are now turned, (or if the wedges I and J are used, they are driven in the loops opposite the wood,) forcing the strap D and the bar or claw in clamp E, firmly holding the handle and strap in the clamps. The square part of the handle is now pressed downward with the hands and confined under
64 the hook, or elbow K. The machine is now taken out of the notch in block N, and so much of the machine as contains the round part of the handle is suddenly immersed in cold water, the screws turned back, (or wedges, if used, driven back,) the handle taken from the machine, stay put on the handle while drying, and the machine operated as before. When other articles are sought to be bent, a stock of the desired form is made, over which to bend the article wanted, then the strap or band and clamps are attached and operated, as in making or bending plough-handles, as near as the length, magnitude, &c., of the article will permit.

What I claim as my invention, and desire to secure by letters patent, is the method of preventing the outer surface of the wood whilst bending from breaking, checking, or splitting, by means of elastic straps or bands, in combination with the clamps and stock, as herein described.

HERVEY H. MAY.

Witnesses:
ERASTUS A. STRONG,
PARDON SISSON.

(Here follows drawing, marked page 64.)

Exhibit "J."

Exhibit "J," referred to in said bill of exceptions and made a part thereof, is in the words and figures following to wit:

The U. States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted A. Gardner Dec'r 11th, 1849, No. 6,934.

In testimony whereof, I, T. C. Theaker, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this eleventh day of April, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the nintieth.

[SEAL.] T. C. THEAKER.

The United States of America to all to whom these letters patent shall come:

Whereas Abel Gardner, of Buffalo, N. Y., has alleged that he has invented a newand useful improvement in apparatus for bending hame, which he states has not been known or used before his applica-
65 tion; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are therefore to grant, according to law, to the said Abel Gardner, his heirs, administrators, or assigns, for the term of fourteen years from the eleventh day of December, one thousand eight hundred and forty-nine, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Gardner in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this eleventh day of December, in the year of our Lord one thousand eight hundred and forty-nine, and of the independence of the United States of America the seventy-fourth.

[L. S.] T. EWING,
Secretary of the Interior

Countersigned and sealed with the seal of the Patent Office.

THOS. EWBANK,
Commissioner of Patents.

The schedule referred to in these letters patent, and making part of the same.

To all whom it may concern:

Be it known that I, Abel Gardner, of the city of Buffalo, county of Erie, and State of New York, have invented a new and improved mode or method of bending the haim-wood, and the iron appertaining thereto, which I denominate "Gardner's hame bending device;" and I do hereby declare the following to be a full and exact
66 description of the construction and operation of the same, reference being had to the annexed drawings, (here follows drawing, marked page 266,) making a part of the specification, in which fig 1 is the side view of the bending block with the haim and iron attached strained upon it. Fig 2 is a side view of the haim. Fig 3, perspective view of the hook detached. Fig 4, transverse section of the haim. The parts comprise A the bending block, B the haim-wood, (bent,) C the iron, D the hook, d d links, and G the cord or ligature. The bending block A is made of hard wood (or metal) of the form shown in fig 1; one edge is straight, and the other (against which the haim is bent) is suitably curved at the end, and continued afterwards in a straight direction, lessening gradually in width towards the other end. The thickness of the bending block should exceed the sectional width of the haim in the largest part. The hook D is made of metal of sufficient strength, and is attached opposite to the curved end of the block on the straight edge by screws or rivets, and so placed that the link *d* will pass over it, making fast to the hook D, during the bending of the haim, (as seen in fig 1,) The haim-wood B, I make by plaining or shaving the wood to the size required, allowing but little fullness for shrinking and finishing. The iron C is then bent at the points where they are to pass over and hold the ends of the haim-wood, the links *d d* inserted; and if necessary, I put a rivet through the wood and iron near each end of the haim-wood. I then immerse in hot water (or soften by any suitable process) for 15 or 20 minutes, as the nature of the wood may require, so far along the haim as I wish to bend to the curve of the bending block; couple the iron C by means of the link *d* to the hook D of the bending block, which I have fastened in a vice, (or which may be be fastened otherwise,) strain the haim-wood and iron C thus worked to the bending block, to the form of
67 said block, and fasten it by a cord or ligature, to retain the haim in its curved position. I then remove the block and hame thus attached to a kiln, or to the fire, or any suitable place to dry; move them about as may be convenient, always letting the hame remain strained upon the block till it has becomed hardened, and will retain its curved shape; after the haim has become sufficiently hardened to admit, the ligature is removed, the iron C or link attached is unhooked, or removed from the hook D, and the haim is there finished as the workman may desire.

The advantages resulting from my invention are—

1st. An almost certainty of loosing no hame-wood, which is sound,

from breaking or fracture, for the effect of the attachment of the iron C with the hook D is such as to fully preserve the continuity of the wood while bending.

2nd. It is much more convenient than the common mode, for the block is easily fastened in the vice, and the haim-wood, being worked down to nearly its proper size, is bent by the application of much less power than by the common way of bending a stick much larger than the size of the haim when worked down, and fitting the wood to the pattern after being bent.

3rd. It increases the facility of drying or hardening the wood after it is bent, there being less wood to dry than by the common mode of manufacture; and the haim can be more easily placed in position to dry or harden to the curve of the block.

4. My invention fits more completely the haim-iron, it being put upon the wood while straight, and then by attaching the iron to the hook D, and bending the same in a curved form, the iron becomes the outside of the curve, and as the curve is increased the iron draws tighter, and being fastened at both ends, the wood must settle close to it.

5th. In the common mode, after the wood is bent, it is then worked down to a pattern, and this has to be varied according to the size of the collar to which it must be applied.

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By my device the haim is fitted to a large or small collar by lessening its curve, and this is done by merely shortening or lengthening the endless ligament or string G, (as seen in drawings.)

6th. It requires but little time or labor to fit the haim-iron while the wood is straight, and it is easily bent to the wood; and both may be done by the same process at the same time.

What I claim as my invention, and wish to secure by letters patent, is the process of bending haims by means of the combination of the hook pieces D, and the iron strap C made fast at the ends, in the manner and for the purpose herein fully set forth.

ABEL GARDNER.

Witnesses:
V. M. RICE,
WM. R. CLEVELAND.

United States Circuit Court, southern district of Ohio.

Exhibit "K, L, M, N, and O."

ALONZO V. BLANCHARD
vs.
ANTOINE PUTTMAN *et al.* } 475.

Exhibit "K, L, M, N, and O," referred to in said bill of exceptions and made a part thereof, is in the words and figures following, to wit:

The plaintiffs will take notice that on Wednesday, the seventeenth day of January, A. D. 1866, the defendants above named will take the depositions of sundry witnesses, to be used as evidence on the trial of

the above cause, at the shop of Leonard Andrus, in the town of Grand Detour, in the county of Ogle, in the State of Illinois, between the hours of eight o'clock a. m. and six o'clock p. m., of said day; and that the taking of the same will be adjourned from day to day, between the same hours, until they are completed.

SAM'L S. FISHER,
Attorney for Defendants.

Service of the above notice is acknowledged, and proof of the official character of the officer whom the said depositions may be taken is, by agreement, waived. Also all exceptions in regard to time.

G. M. LEE, *for Pl'ff.*

Depositions of witnesses taken before me, James Rogers, a notary public within and for the town of Grand Detour, county of Ogle, and State of Illinois, at the office of Leonard Andrus, in
69 the town of Grand Detour, in the county and State aforesaid, on Wednesday, the seventeenth day of January, 1866, at eleven o'clock a. m., to be read in evidence on behalf of the defendants in a suit of law now pending in the Circuit Court of the United States within and for the seventh circuit and southern district of Ohio, wherein Alonzo V. Blanchard, John D. Blanchard, and Franklin Blanchard are plaintiffs, and Antoine Puttman, Conrad Weaver, and John Bittinger are defendants.

Leonard Andrus, of lawful age, being produced, cautioned, and solemly sworn, on behalf of the defendants, deposes and saith as follows:

By S. S. Fisher, defendant's counsel:

Question 1st. What is your name, residence, and occupation?

Ans. Leonard Andrus, Grand Detour, manufacturer of ploughs.

Question 2. How long have you been making ploughs at Grand Detour?

Ans. Twenty-two years and nine months.

Question 3. Do you bend your plough handles by machinery? If yea, when did you first use a machine for that purpose?

Ans. I think in 1844 or 1845 we began to bend by machinery.

Question 4. Please to describe the machine which you used in 1844 or 1845 for bending plough-handles.

Ans. It was a table or plank about five or six feet long, standing on four legs, with a strap and abutment on the end of it, for the end of the handle to rest against; and a block at the other end, and a key to put in between the block and handle. A lever was used to bend the handles. A pattern to form the handle over was placed on the handle to be bent, and a lever with a strap or hook clasping the handle and strap, when the lever is brought down in a line with the handle and bends the handle into shape of pattern.

Question 5. Please look at the drawing marked "L A," and the model marked G, and state if you know what they represent.

Answer. They represent the machine I have just described,
70 with the exception of a key in the room of the lever B.

Question 6. Please point out the several parts of the machine by letter upon the drawing "L A."

Ans. A is the table or platform; B over the table, on my machine, would be the block; G, the pattern; D represents the strap; E, the abutment; F, the lever; G, the handle; H, a hook or clamp.

Question 7. Please look at the drawing marked "L A No. 2," and state what it represents.

Ans. It represents the end of the table, with a wedge between the block and handle.

Question 8. What was the block and wedge used for in your machine?

Ans. To press the handle against the abutment at the end of the strap.

Question 9. How was the pattern or mould attached to the handle?

Ans. It was fastened either by hook or clamp.

Question 10. How long did you use the first machine, built in 1844, or 1845; and how extensively?

Ans. I should judge, as near as I can recollect, some five or six years. We bent all the plough-handles we used, probably five or six hundred per year.

Question 11. What was the office of the block B and key or wedge K during the operation of bending?

Ans. To press the handle firmly into its place to prevent the fibres from parting or the wood from breaking.

Question 12. By whom was the machine built? by whom, and when was it used?

Ans. By David Gans, and used in Andrus & Deer's shop-yards, at Grand Detour.

Cross-examined.

By G. M. Lee, for pl'ff:

Quest. 1. Did the 1st machine of David Gans have the steel strap marked "D" in the drawing, and shown in the model?

Ans. My impression is it had, but bent the reverse way, as near as I can recollect. The block represented on the strap, on model G, and marked E in the drawing, was not our old machine; but instead the strap was turned up for the handle to be bent to rest against, leaving nothing in the place of block E except the strap, which was, a little over the eighth of an inch in thickness.

71 Question. What was the stirrup marked I on the bending lever F of drawing L A made of? Give its size and thickness.

Ans. It was made of wrought-iron, about $\frac{3}{8}$ of an inch in thickness, and from $1\frac{1}{2}$ inch to 2 inches wide.

Question. What was the material size and thickness of the hook marked H in the drawing L A mark in model?

Ans. I think it was made of nailrod, which is from $\frac{1}{4}$ to $\frac{3}{8}$ of an inch square.

Q. How did the foot lever marked B work? and state whether it was on the first machine; and if so, whether it was taken off, and why.

Ans. I do not recollect; but my impression it was not on the first machine. I have a feint recollection of seeing them bending with the foot lever, either on the foot machine or on the one afterwards built; but am not certain.

Ques. Please state how you confined the top or unbent end of the handle near the block B; what space was usually left between this end of the handle and the block, and how that space was filled.

Ans. Confined by wedges driven between the end of the handle and block; the size of wedges was in proportion to the length of the handle. We used sometimes one wedge, sometimes two; but seldom more than two.

Question. Did you always put in wedges enough to make the handle fit tightly between the block B and the upturned end of the strap on E?

Ans. I do not know; but I suppose it was always the intention to make a close fit.

Ques. Did you ever use the foot lever B on any machine? and if so, when? or if you saw it on any machine, state when and where.

Ans. I have an indistinct recollection of having seen the foot lever; but when and where I cannot tell; but all of our later machines have used the block and wedge.

Question. State how this machine, since 1845, has done its
72 work, and what proportion of the handles bent have been split or broken.

Ans. I cannot tell what proportion was broke in bending in the early machine. It depended on the timber and success in steaming, and the operator. I think our present machine is more perfect, but whether we loose any more timber now than then, I do not know.

Question. State whether the clamp or block E was used on any of your machines? If so, who put it on, and when?

Ans. I cannot tell when, but have an indistinct recollection that such a block was used on the end of some of our straps, but cannot tell who put it on, or when. I call the turn-up on the end of the strap a block, as it is used for the same purpose.

Ques. Please describe the difference between your present machine for wood bending, and this of Gans, shown in the model G and drawing L A, and state the different modifications, and by whom made, and when.

Ans. In the room of the strap D we use a chain consisting of a series of flat links. The chain is rivitted to the bed or table in the same manner as the strap shown upon the model, and on the other end of the chain is a strong flat hook, turned up for the end of the handle to rest against. There is no foot lever on my present machine. We use the block and wedges, and the mould C is made of cast iron. These are all the variations in my recollection, except

that the mould C, when made of wood, was groved; but now, in lieu of this grove. are iron flanges are used.

Question. Please look at affidavit, Exhibit No. 1, and state where you made the same in A. D. 1858, on August 9th.

Ans. Yes.

Re-examination.

Question. Look at drawing L A, No. 2, and state how the part marked X represents the end of the strap D, as turned up for the end of the handle to rest against.

Ans. It is much like it, only it did not run up above the
73 handle.

Question. What was the strap D made of, and what do you say of the strength of the part turned up?

Ans. It was made of steel usually. The turn-up at the end was strong enough to hold the handle in its place.

L. ANDRUS.

Also, at the same time and place, David Gans. of lawful age, being produced, cautioned, and solemnly sworn on behalf of the defendants, deposes and says as follows:

Question 1. What is your name, age, residence, and occupation?

Answer. David Gans; age 45; residence Pine Rock, Ogle C., Ills.; and occupation farmer, formerly millwright.

Question 2d. Did you build a machine for bending plow handles for Andrus and Deere? If yea, when did you make such a machine? Describe it.

Ans. Yes; made such a machine, as near as I can recollect, in 1845, in the summer season, I should think in June. It was arranged on a suitable piece of wood, with four legs to it. It had a spring-steel strap, a suitable length to take in the part of the handle to be bent. This strap was formed heavy at the end, and bent up over the end of the handle. There was a parting in it sufficient to receive a hook over the end of the handle, when the spring was removed to hold the handle in its place. This spring strap was fastened down to the bench at the other end of the strap. The handle was secured by a wedge; at the opposite end of the handle was bent by means of a block made the curve of the handle. This block was forced down by means of a lever attached to the block. This lever went over the spring to confine the end of the lever to the end of the handle. Then, after the bending, a hook was passed over the end of the handle to secure it. The wedge now being removed, relieved the spring, and the hooks held it fast to the
74 block, or confined it to the block. This is the description of the first machine made, but afterwards alterations were made.

Ques'n. What changes, if any, did you make in the machine, and when?

Ans. The changes made in the machine was attaching a lever in place of the wedges to confine the end of the handle. This lever was forced down by the pressure of the foot, which pressed against

the end of the handle and forced it against the turned end of the spring. The alterations, I believe, was made in the same year.

Quest. Look at the model G and drawing L A, and state how far they represent the machine made by you in 1845. Point out any differences.

Ans. The difference is the strap being bent over the end of the handle had a parting in the centre to receive a hook to secure the handle after being bent. The foot lever was secured while bending, by the lever being secured by slipping into notches, by a piece of iron extending from the bench down. The balance of the machine represents the one built by me in every other particular.

Quest. What was the object of wedging the end of the plough-handle between the turned up end of the strap and the block ?

Ans. To confine the handle to secure an end pressure, the design of which was to confine the fibres of the wood, and keep it from parting on the outside of the handle, by which means we contract the inside of the handle.

Question. Point out, by letter, on the drawing, the different parts of the machine.

Ans. Letter A represents the bench, B the foot lever, C block or mould on which the handle is bent, D the strap, E the strap-head, F the lever by which the mould is forced down, G the handle while being bent, H the hook or clamps to secure the mould to the handle after it is bent. I, in my machine, the handle or bending lever slipt over the mould, and was fastened by a bolt running thro' it and the mould, which was removed after the handle was bent.

75 Question. Did you operate the machine ? If so, how long, to what extent, how successfully, and how publicly ?

Ans. Yes. I operated the machine about three years, on from one to two thousand handles each year. It operated almost entirely with success when I attended to my business in operating. The first piece of timber I ever bended was a brash piece of butternut wood, operated out of doors, in the mill yard.

Question. Look at drawing "L A, No. 2," and state what it represents.

Ans. It represents a plough-handle in a bending machine, being secured by a wedge. It is a fair representation of a side view of the machine I first made.

Cross-examined.

By G. M. Lee, esq.:

Ques'n. Please look at exhibit, plaintiff's No. 2, now shown you, and hereto attached, and purporting to be a copy of an affidavit made by you Aug. 9, 1858, before T. H. Winans, J. peace, the original of which is submitted, but not attached to deposition, and state if you made such an affidavit.

Ans. Yes; I made such an affidavit.

Ques. Please state how many foot levers you used on machine.

Ans. Only one that I know of. That was attached to the first machine, made while in Mr. Andreus' employ.

Quest. How much was that foot lever used, and why was its use abandoned?

Ans. I could not say how long. I think we did not use it more than six months, because I did not see any advantage in the foot lever over the wedge. I preferred the wedge.

Ques. Do you know of any foot lever being used by any one else on any of these machines made after the first?

Ans. I do not.

Quest. Please state whether the handle, before it was bent, was confined tightly between the block D and the turn up end of the strap at E, in the drawings L A.

Ans. Yes.

Ques. How many wedges did you use to fill space between
76 the end of the handle and block B?

Ans. One. My handles was sawed a regular length.

Quest. Please state how many of the machines you know of to have been operating, and when; and what machines of this nature are still in use.

Ans. I do not know of any other personally, but the one used by Mr. Andrus. I only used one machine. That was left on the premises of Mr. Andrus, at Grand Detour, when I left, in 1848. Since then I have used no wood bending machines, but have been farming.

Ques. Please state what proportion of the handles bent were crushed or splitted or broken in bending in this machine, and how this happened.

Ans. One in ten were spoiled some way, in being crushed or broken. It happened sometimes by having the handle unevenly shaved, and sometimes by uneveness in the grain of the wood; and if not properly steamed and attended, they will sometimes break.

Quest State where the handles did not cupple sideways, and thro. themselves out in bending.

Ans. They did in a few cases.

Quest. Please state whether the mould or block C shown in the drawing was made of wood, and whether it was groved on the under side so as to fit around the handle, and whether any iron mould was used while you run the machine.

Ans. It was made of wood. In the first place they was not groved; afterwards I groved them to a certain extent. No iron mould was used while I run the machine.

Quest. How long was the grove in the wooden mould you used?

Ans. About fourteen inches.

Quest. How long was the handle when fastened in the bend?

Ans. About four feet.

Ques. What was the usual length of the strap?

Ans. About eighteen inches.

Quest'n. Between the end of the grove, being about fourteen inches along the strap from its turned up end at E, was there
77 anything from the termination of the grove to the end of the

handle, at the wedge at B, to prevent the handle from springing or throwing out sideways?

Ans. There was not.

Quest. What became of the machine since you left it on Mr. Andrus' premises, have you seen it since?

Ans. I believe I saw it after I left, but have not seen it in ten years. I do not know what is become of it.

Re-examination.

Question. When you say that you know of no machine of the nature of your old one in use, except the one used by Mr. Andrus, please state exactly what you mean by the term "used," as to time of use?

Ans. The machine used by Mr. Andrus from that time to the present, as Mr. Andrus only uses one machine at a time. I have just examined Andrus' machine now in use; the material is not the same as my machine was made of the principle of the machine is the same; with some improvement in cast-iron mold, instead of wood, and having flanges on the cast mold, and also in the strength of the strap, which is made of flat links in this machine.

Question. What was the strength of the end of the strap turned up, and what was its thickness?

Answer. The end of the strap was about three-eighths of an inch thick when it was turned, and it was sufficiently strong to hold the timber in its place.

DAVID GANS.

Plaintiff's "Exhibit No. 2."

I, David Gans, on oath, depose and say, that I am the one who gave a deposition in the case of Blanchard & Morris, that the machine for plough-handle bending, made and used by me at Grand Detour, of which I testified, had a bending lever, not like the one shown to me in the drawings now shown to me, but it was connected to the mould by two side pieces which slipped over each side of the mould, and was pinned to it through the mould. There was no strap used to
78 bend with, except the one with a head "D." That strap was fastened to the bench at one end. There was no clevis, as represented in the drawings, but the handle was fastened to the mould by a hook and staple, the staple being in the mould block, and the hook passed over the end of the handle; we used only a single wedge. We tried the lever to keep up the handle to the mould—an angular lever marked by the foot about 1846—but abandoned the use of it, because it was not successful. I think I used it but a short time. I returned to the use of the wedge. I used to put the wedge in about as I thought it ought to be. Then I used to [to] bend the handle without altering the wedges. I never used any but rived handles. We did not saw handles then. I used the machine about three years. After that, I either sold out to some one else or left it; I don't know what became of it. I used the machine after I quit Andrus, again, in 1848, bending handles for Andrus. This is the last

I used the machine or know of its being used. We used to break and cripple more or less of our handles bent in my machine, the proportion depending in the stock. We had then the best stock the country could afford, I used to spoil or break, say 10 out of 100 of what I bent. If the handle was not shaved uniformedly, or if one part was thinner than another, it used to throw the bent more into that part. Sometimes the handles were crippled on the inside. Sometimes, as there was nothing to hold the handle sideways, it would cripple sideways and throw out.

DAVID GANS.

Sworn to before John H. Winans Aug. 9, 1858.

Also, at the same time and place, Stephen E. Hathaway, of lawful age being produced, cautioned, and solemly sworn on behalf of the defendants, deposes and saith as follows:

79 By S. S. Fisher, esq.:

Question 1. What is your name, age, residence, and occupation?

Answer. Stephen E. Hathaway; age, fifty; residence, Grand Detour, Ogle county, Illinois; and occupation, wagon-maker.

Question 2. What do you know of the use of machines for bending plough-handles in Grand Detour? State when and where such machines were first used within your knowledge, and describe them.

Answer. The first and only place I think I have ever seen any used was here at Grand Detour. It was in 1844 and 1845 that I used them. I used one machine; it was made of a stick of timber about six or eight inches wide, four inches thick, and about seven feet long. It had, I should say, four legs in it; and it had a strap of steel, which lay under the the plow-handle, turned up at the end to form the catch to hold the handle, with a slit right in the end of it for a hook to fasten the mould and band together. We put the handle to be bent on the strap, with one end square up against the turned up end of the strap. Then we keyed the other end of the plough-handle up with a wedge against the post; then we took a lever and put it over the end of the spring-handle and mould; then brought the lever down on a level with the handle. We fasten the mould and handle together by means of a hook. There was no hook underneath the end of the strap to hold the lever; the pressure held it.

Question. What was the handle to be bent, wedged, or keyed between the post and turned up end of the strap for?

Ans. To keep it from breaking when we bent it; to prevent it from slipping, and press the wood together to keep it from breaking.

80 Question. Look at the drawings "L A and L A, No. 2, and the model G, and state how far they represent your machine issued in 1844 and 1845; point out any differences?

Ans. Like modle G, with the exception of the foot-lever. In the room of that we used the key or wedge, like the drawing L A, No. 2. Ours had a clamp on the end of the strap, made heavier by driving up or welding on a piece of iron; there was no catch underneath. A represents the platform; B, the post we wedge against; C, the mould;

D, the spring or strap; E, the head of the spring ketch; F, the lever to end handle; G, the plough-handle; H, the hook to fasten the plough-handle and mould together after bent.

Question. State how long, how publicaly, how successfully, and how extensively your machine was used?

Ans. We used it, the machine, in 1844 and 1845; used back of the shop, in sight of the street; good success while using machine; we bent some six hundred plough-handles. This is not the machine used by L. Andrus, but by Hitchcock and Hathaway, a separate concern; the machine laid back of our shop from 1846 until 1858; we then boxed it up and sent it to Mr. Morris, at Cincinnati; we quit useing the machine, because we stopped making ploughes.

Cross-examined.

By G. M. Lee:

Quest. Have you testified before in a case of Blanchard *vs.* Morriss? and if so, when and where, and what lawyer took your deposition, and for which party?

Answer. I was here for the purpose, and could not say where my depositions were taken or not; it was about eight years ago.

Quest'n. What proportions of your handles did you break or spoil in bending, and when they were of uniform length?

Ans. They were intended to be cut of uniform length about four and half feet long, and probably broke one in every eight or
81 ten, cannot tell exactly.

S. E. HATHAWAY.

Also, at the same time and place, William K. Casterline, of lawful age, being produced, cautioned, and solemly sworn on behalf of the defendants, deposes and saith, as follows:

Question. What is your name, age, residence, and occupation?

Ans. William K. Casterline; 51 years; Grand Detour; blacksmith.

Question. State what you know of a machine for bending plow-handles, made by David Gans, at Grand Detour. When was the machine made?

Ans. The machine was made in 1844, between the month of April and July. I was boarding at Mrs. Gans at the time the machine was made, and made the iron work for the machine. I made the iron spring that bends over the back of the plough-handle; they frequently broke and came to me to be fixed.

Question. How were those springs made?

Ans. The back spring was probably one inch and half wide, twenty inches or more in length, and 16 of an inch in thickness, band iron. a hook on the end, formed of heavier iron, to come up on the end of the plough-handle, was riveted on the [the] end of the spring, making the end of the spring $\frac{3}{8}$ to $\frac{1}{2}$ inch in thickness when the hook was turned up; at the first they was all made in that way.

Quest. Please look at the model G, and see how far it represents the machine made by David Gans in 1844?

Ans. It represents the machine as nearly as you can get at it.

Ques. Did you ever make a machine like that yourself? If so, when and where?

Answer. I made one in March, of 1846, at Rockford, Winnebago co., Ills.; it was like mould G, with the exception of the foot lever. I used the post and wedge.

Question. By whom was the machine in Rockford used? How did it work, and how long?

Ans. I cannot remember the name; it worked very well; was used only a short time. The man I made it for went to Salt Lake,
82 and, if I mistake not, his name was Grinell. I do not know what became of the machine; I have not seen it since 1846.

Cross-examined

Quest. How many of the iron straps did you make and repair at Grand Detour?

Ans. I made a good many; probably made fifty.

Quest. Do you blacksmith for Mr. Andrus?

Ans. Yes.

Quest. Does the chain now used by Andrus on the machine break as often as the strap?

Ans. No; it seldom breaks.

WM. K. CASTELIN.

Sworn to and subscribed in my presence by the above-named L. A. Andrus, David Gans, S. E. Hathaway and W. K. Casterline, this 17th day of January, 1866.

[SEAL.] JAMES ROGERS,
Notary Public Ogle Co., Ills.

Further and other certificate is by agreement waived.

LEE, *for Pl'ffs.*
SAM'L S. FISHER, *for Def'ts.*

Plaintiffs Exhibit, No. 1.

I, Leonard Andrus, of the firm of Andrus & Bosworth, on oath, depose and say that I am the same person who testified in the case of Morris& Blanchard. I am well acquainted with the old machine testified to by Gans and myself. The original machine corresponded with the drawings annexed to my deposition. There were several wedges used for the purpose of holding the stick up the mould to prevent it from slipping back, and to keep the stick in place and prevent the fibres from parting. A lever was used a few months instead of these wedges, to accomplish the above-mentioned purposes, but we gave it up, because it did not answer the purpose. It did not hold the stick in place, and so we abandoned the lever and took the wedges. The old original machine, testified to, was used from about 1845 to 1848, and it was set out-doors among the rubbish, till a few years ago; it got broke up or lost in 1848, or thereabouts. I built here another

machine like the old one in principle and in substance, and used that machine until about 4 years ago, more or less, when we put in a
83 chain, that instead of an iron strap on the outside of the bend. About one year ago, we substituted for the wooden blocks, which were turned up, cast-iron about $\frac{3}{8}$ or $\frac{1}{4}$ inch high to hold the sides of the handle. As long ago, as about 1846 or '7, we used to hollow out the mould to correspond to the shape of the handle, but this plan we gave up many years ago. I don't know why we gave it up, but such was the fact. We used to bend rived handles principally on the old machine occasionally, only a few sawed ones. We could not bend cross-grained stuff well, as it would shiver and check. The average breakage on the old machine would be, I could not say what, but sometimes we would break ten or 12 in a hundred, and sometimes few or none, depending upon the quality of the timber and the luck of the operator. The value of the flanges on our present mould is to keep the curve of the handle in the same plane with the stock itself; that is to make the handle take and keep the required form. We sometimes lynsh out the handle even with the machine, but though it keep the bend right, it is not wholly successful to prevent such crippling. We used to find in the old machine the difficulty, that when the stock of the handle was not of unform stiffness, a density, or not equally or properly steamed, the handle would not conform to the mould, but would use up the planes, or rather it would not bend to the mould. We find the same difficulty in our present machine. The way we obviate the difficulty, is by making the handles larger, and then cut them down by machinery to the form desired, by truing the curve as far as may be.

L. ANDRUS.

[Here follow two drawings marked page 83.]

84 *Ex. P.—Jno. C. Morris Patent.*

Exhibit P, referred to in said bill of exceptions and made part thereof, is in the words and figures following, to wit:

The United States Patent Office to all persons to whom these presents shall come, greeting.

This is to certify that the annexed is a true copy from the records of this office, of the matter of the letters patent granted Jno. C. Morris March 11th, 1856, No. 14,405.

In testimony whereof, I, T. C. Theaker, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this thirteenth day of February, in the year of our Lord one thousand eight hundred and sixty-six, and of the independence of the United States the ninetieth.

[SEAL.] T. C. THEAKER.

No. 14,405.

The United States of America to all to whom these letters patent shall come:

Whereas John C. Morris, of Cincinnatti, Ohio, has alleged that he has invented a new and useful improved method of bending wood, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said method, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the commissioner of patents, signifying a desire of obtaining an exclusive property in the said method, and praying that a patent may be granted for that purpose. These are therefore to grant, according to law, to the said John C. Morris, his heirs, administrators, or assigns, for the term of fourteen years from the eleventh day of March, one thousand eight hundred and fifty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said method, a description whereof is given in the words of the said Morris in the schedule
85 hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this eleventh day of March, in the year of our Lord one thousand eight hundred and fifty-six, and of the independence of the United States of America the eightieth.

[SEAL] ROBERT McCLELLAND,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
C. MASON.
Commissioner of Patents.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, John C. Morris, of the city of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a new and useful improvement in a machine for bending wood for wagon-felloes, ship timber, plough-handles, chair stuff, and for all other purposes in which wood is required to be bent; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings forming part of this specification, and to the figures of reference marked thereon; similar figures refer to corresponding parts.

In bending wheel-felloes and other articles around forms levers have been used for bringing the piece to the required shape by connecting said levers with a strap at each end, the strap being placed

at the back of the piece required to be bent, and then drawing the ends of the levers together, which bends the piece around the form, but owing to the levers having the liberty of turning transversly during the process of bending, which is caused by the tendency wood often has to twist, from its being harder on one side than the other; or when two or more pieces are bent at once, some are harder than
86 others, and in such cases it is impossible to make true work; and with this method of bending, the ends of the article being bent are not clamped or otherwise held firm, which admits of the piece expanding endwise, and breaking transversely on the outside during the process of bending.

My improvement is intended to remedy the foregoing defects, and yet employ levers to effect the bending, and consists in working the levers on axes which deprives them of all transverse motion during the operation of bending, and brings the piece being bent fair against the form; clamps are then placed on and against the ends of the piece being bent, and connected together, which prevents and expansion endwise, or breaking of the piece while bending; and the said clamps lay against the sides of the levers, and as the levers are brought together, the clamps will slip on the levers, to allow the piece being bent to accommodate itself to the form desired, and thus make a true piece of work, and prevent end separation, and breaking in the process of bending. My improvement is applicable to bending wood for all and any purposes, such as ship timbers, wheel-felloes, plough handles, chair stuff, and other articles not here mentioned. In some cases but one lever will be required, such as bending plow-handles. To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and operation by referring direct to the accompanying drawings.

Fig. A represents a top view of the table, to which the bending apparatus is attached; fig. B is a side elevation of the same
87 figures; C and D are different views of the strap and clamps placed at the back and ends of the piece being bent; figures E and G show the application of the improvement, as applied to the bending of ship timber and plow handles when but one lever is used; 1 1 represents the table on which the form 2 rests, and held to its place by the pins 3 3; the form is made to suit the shape required to be bent; in the present instance there is one placed on the table for bending wagon felloes; 4 represents the felloe; 5 is an iron or steel band. The clamps 6 are attached at the ends by pins 13 projecting from the clamps, and made to pass through holes made through the ends of the straps; 7 are the levers working on the fulcrums 8, and are operated by the drum 14, and cords 11, the drum being worked by hand with a crank, or by application of power otherwise. The cord is made to pass around the friction rollers 10, and operated substantially as represented in fig. A. As the levers 7 are drawn together in the process of bending, the clamps 6 connected to the strap 5 are made to slip against the sides of the levers to allow the piece being bent to accommodate itself to the form 2, and the levers working on the fulcrums 8 prevent it from twisting, or having any transverse

motion, thereby causing the piece to be brought fair against the form. and thus make a true piece of work; 12 12, are tongue pins attached or cast to the back of the clamps 6, and work in groves made in the inside of the levers to prevent the clamps from slipping later-
88 ally, or otherwise becoming deranged, from their proper relative position to the levers during the bending operation; 9 is an eccentric clamp for holding the wood and straps to the form when first put in the machine, after which the piece is operated upon by the levers 7, cords 11, and drum 14, as fully represented by the drawing and dotted lines in fig. A. It is often the case that two or more pieces will be bent at one time, and will be laid together, as shown in fig. H, and placed in the machine to be operated upon by the levers as before specified. In figure E the improvement is applied to bending timber for ship building, and represents its application to bending a knee for the hull of a vessel, one end of the timber being properly held between stay-rods, while the opposite end is bent around the form 15 by the improved working lever 7 and clamp 6. In such cases but one lever and clamp is used. Figure G represents the improved apparatus applied to the bending of plow-handles around the form 16. The piece forming the plow-handle will be held by any suitable means while being bent. In bending wagon-felloes, as the piece is laid against the strip and between the clamps, as shown in fig. A, hooks 17, provided with pin holes, will be placed at the ends of the wood for holding the piece after being bent to the form by passing the pins 18 through the holes in the hooks 17, and having the pins to come on the inside of the catch 19, which will commonly be a part of the form, and thereby holds the piece bent to the form. The strip and clamps are taken from the felloe, and the form 2 is raised from the table
89 and placed between two pieces of timber which hold the felloe to the form, after which the catch hooks 17 and pins 18 are taken from the ends of the felloe and a strip of wood nailed across to hold it to its proper shape. The felloe, or felloes, are then taken off the form, which completes them, and the form is again ready to be placed on the table for operation. What I claim as my improvement, and desire to secure by letters patent, are the clamps 6 6, to prevent end expansion, and the levers 7 7, working on fixed fulcrums when in operation, all substantially as and for the purpose set forth in the foregoing specifications.

JOHN C. MORRIS.

Ex'd, A. T.
Witnesses:
MARTIN BENSON,
L. W. SMITH.

U. S. Circuit Court.

Exhibit "R."

A. V. BLANCHARD & Co.
vs.
ANTOINE PUTTMAN *et al.* } 475.

The plff's ask the court to charge the jury as follows:

1st. Thomas Blanchard claims to have invented a new method of wood bending, and it is the province of the jury to determine what that new method is.

2d. If the jury find in defendant's machine the essential elements and parts of Blanchard's invention, working on substantially the same principle as Blanchard's, there is an infringement, even if there be an omission in defendant's machine, of certain unrepresented parts in Blanchard's, and a varience in form from his.

3d. No machine invented, or in public use before Blanchard's invention, can defeat his invention, unless they were substantially the same as his, and were either described in patents or public books before his invention, or were put in public and successful use before his invention, and are shown to have worked in the same mode as Blanchard's, and to have worked well and efficiently, and have been useful to the public. If these prior machines worked
90 badly, and were worthless, and have been thrown away and abandoned by the public, they do not affect Blanchard's patent, even if they worked upon the same principle as his.

4th. If Blanchard's machine has, as a separate improvement, means shown for bending wood by end pressure, and also independent means shown for relaxation, which relaxation may be used or not in the machine at will, then the defendant's machine will infringe if it uses either of these functions and separate improvements.

G. M. LEE, *Plff's Att'y.*

Exhibit "S."

Exhibit "S," referred to in said bill of exceptions and made a part thereof, is in the words and figures following, to wit:

United States Circuit Court, southern district of Ohio.

"Charge of the Court."

A. V. BLANCHARD *et al.*
vs.
ANTOINE PUTTMAN *et al.* } 475

This suit is brought by these plaintiffs as the assignees of the administrator of Thomas Blanchard. It is based on a patent for an improvement in bending wood, issued to said Blanchard Dec. 18,

1849, and reissued to him on the 15th day of Nov., 1859. The declaration alleges that the defendants have infringed the exclusive right granted to Blanchard under that patent. There is no question as to the title of these plaintiffs under this patent by the assignment to which I have referred, and therefore I need not detain you by any remarks upon that point. These defendants are licensees under John C. Morris; that is, they use and have a license to use the wood-bending machine, patented to Morris. The allegation on the part of the plff's is that that machine is an infringement of the machine patented to Blanchard. That is one of the issues, and a very material one, upon which you are to pass. Morris, as you will have learned in the course of this investigation, is also a patentee of a wood-bending machine, his original patent, issued the 11th day of March, 1856, and was reissued to him the 27th of May, 1862. The
91 defences to this action, interposed by the defendants, are—First, That the Blanchard patent is void for want of novelty, and secondly, That the machine constructed under Morris' patent, and used by the defendants, does not infringe the exclusive right of Blanchard, and that they are not, therefore, liable in this action. I will first call your attention to the question of the novelty of Blanchard's invention. You are doubtless familiar with the principals of patent right law—that the novelty of an invention is an essential element of a valid patent. Patent rights are only granted upon the theory that the thing discovered, and for which the party asks for an exclusive right, is new as well as useful; in other words, that it was not known before, and is the invention of the party who claims a patent for it. And in this connection I may say, as a principle of law, familiar to every one at all conversant with the subject, that the emanation of a patent from the proper authorities of the government affords a presumption that the invention patened is new and original with the party who obtains the patent. That is the legal presumption, arising from the fact that all patents must be issued with certain formalities, and that the officers charged with the administration of the patent laws are required very astutely to investigate every claim made for a patent. The applicant is, moreover, obliged to swear that he is the original inventor of that for which he asks a patent, and it is only upon a compliance with these requirements of law that the Commissioner of Patents is authorized to grant a patent. I merely advert to these principals as explanatory of the reason of the prima facie presumption in favor of the novelty, as also of the utility, of every patented invention. But, in this connection, it is proper to state that while this presumption
92 does exist it is competent for one charged with an infringement to show that, in point of fact, the invention was not new, and that the party ought never to have had a patent for it; and if he succeeds in making this proof, he establishes the invalidity of the patent, and it is a mere nullity.

Now, it is claimed under the first issue to which I have referred, namely, the want of novelty in the invention of Blanchard, that there is evidence of other machines in use prior to the date of

his invention, which anticipated, or were substantially the same as that for which he procurred a patent. It is not my intention to detain the jury by describing the various machines which it is contended anticipate the invention of Blanchard, and which show, as it is claimed, that all the elements of his invention were known prior to the date of his patent. It is a question for the jury whether the want of novelty is made out. It is a question of fact, depending upon the evidence. To substantiate the position taken by the defendants, impeaching the novelty of Blanchard's invention, there has been a good deal of testimony adduced, and various wood-bending machines and models have been exhibited to the jury. I shall merely refer to them without attempting to analyze or dissect them. There is the one patented to E. Reynolds in July, 1835, and another patented to Jonathan Mulford, in the same year. Evidence has also been introduced of a rejected application by one May, for a patent for a wood-bending machine, and there is also evidence of a machine patented to Abel Gardner in 1849 for bending hames, also of a machine not patented which was first constructed by Mr. Gans, and used, as it appears, in 1845, and for some years subsequently, in the State of Illinois. Now, in regard to several of these machines, you have the models before you. And I may remark here that modles are of ten times the very best evidence that can be adduced.

There is nothing more satisfactory upon questions involving
93 the identity of several mechanical structures than the exhibition of the machines, or accurate models of them. When the jury have these before them, although they are silent witnesses, they will have no hesitency in believing that they are perfectly reliable. In reference to the Gans machine, I am aware that one of the witnesses, an expert introduced on the part of the defendants, does say it is substantially the same as Blanchard's, and involves essentially the same principles and mode of operation. Other witnesses express a different opinion; but, as I remarked, I do not intend to go into an analysis of the testimony on the question whether these machines, or any of them, do anticipate the invention of Blanchard. It is for the jury to pass upon that question, and they will do it, of course, upon the evidence which they have before them. I may state here a principle that is very familiar to those who are acquainted with patent right law, that this question of identity, as has been very truly stated by the counsel does not depend upon the appearance or the form of the two structures claimed to be identical; it depends simply upon the question whether they are the same in their mode and principle of operation, and whether one is a mechanical equivalent for the other; for it is obvious that there may be two machines very dissimilar in structure and appearance, which yet act precisely upon the same mechanical principles. The question for the jury in such cases is to ascertain, satisfactorily to themselves, whether the two structures are in all substantial particulars the same, or whether there is, or is not, a substantial difference in their mode of operation. Upon this subject, in relation to

these various machines or structures that have been exhibited here, the jury will probably conclude that none of them combine all the elements of the Blanchard invention. The Gans machine
94 is, perhaps, the only one that will create any doubt in the minds of the jury on this question. It will be for them to say whether that combines all the elements or parts of the Blanchard improvement. I will say here, without detaining the jury further upon the question of novelty, that where a machine has been long in public use, under a patent which has exhisted for a number of years unchallenged and undisputed, a jury should hesitate before coming to the conclusion that the patent was void, on the ground of a want of novelty. I mean by this that a jury should be clearly satisfied in their own minds that the patented invention in controversey was anticipated by something known before the date of the patent, in order to come to the conclusion that the patent was void on the ground adverted to.

It becomes necessary, gentlemen, that the court should give a construction to the claims of the Blanchard patent, with a view to the question of the novelty of his invention, or at least as having a bearing upon that question. One point in controversey in regard to this Blanchard patent, as I understand it, is whether it is for an entire machine or a machine as an entirety, or whether the patent is to be construed as a patent for a combination; that is, a combination of different parts so arranged as to produce a new and useful result. In my view of this question the patent to Blanchard can only be regarded as a patent for a combination of different parts or elements.

It is called in the patent itself "A new and useful improvement in bending wood." In the specification it is designated as "A new and improved method of bending wood." The specification which has been read in your presence is exceedingly elaborate and minute. The patentee refers to the fact that in all the prior modes of bending wood there were great and manifest defects. He does not
95 claim that he was the original inventor of the art of bending wood. The claim is that he has improved upon all methods before known for that purpose. Now, if I am right in what I have suggested to the jury, that this patent is to be regarded as a patent for a combination of the various parts or elements of the structure, there is applicable to this case this principle, which it becomes important for the jury to consider, namely, that there can be no infringement of such a patent unless the person charged with the infringement has appropriated and used all the parts of that combination. To illustrate my meaning: a person obtains a patent for a machine consisting of three different elements in combination; those three elements, separately, are none of them new, but the patentee, by his ingenuity and study, has contrived to combine them so as to produce a new and useful result, and that is a patentable subject under our patent laws; but one charged with an infringement of that combined machine is not liable unless he has used all of the three parts that constitute the combination. If he takes one of them only, or two of them, leaving out the third, it is not an infringement. These

are very familiar principles, and I suppose will not be controverted.

If, therefore, the patent to Blanchard is for a combination, it is not impeached for want of novelty, unless the jury find that the prior machines exhibited or proved have all the elements or parts of the Blanchard machine.

I come now to the question of infringement which I have partially anticipated in the remarks which I have already made. This, like that of novelty, is a question exclusively for the jury, depending altogether upon the evidence. It is for the pl'ff to establish to the satisfaction of the jury the fact of infringement; and this involves directly the question of the identity of the Blanchard machine and the Morris machine—are they substantially in their prin-
96 ciple and mode of operation alike? I may remark here that both these parties are patentees, and the presumption equally applies to both in relation to the novelty and utility of their inventions. There is a presumption, from the issuance of a patent to Morris years after the date of the Blanchard patent, that Morris had invented something different from the invention for which a patent had been previously granted to Blanchard. If the commissioner had come to a different conclusion, it would have been his duty to reject the application of Morris. I state this as affording a presumption in favor of the novelty of his patent, and as being for a different invention from that previously patented to Blanchard. I do not know that I could enlighten the jury by attempting a minute analysis of the claims of the Morris patent. It has been read and commented upon so extensively, and so clearly illustrated by the models which have been presented before you, that it is probable I should throw no light upon its claims and characteristics by comments or explanations. The claim or summing up of Morris' patent is for a combination composed of three distinct elements. The first is "A wood-bending form to which timbers are made to conform by bending them from the inner or end of the desired curve outward, when used in combination with abutments or clamps to prevent or regulate end expansion and levers, or handles or their equivalents, to guide the bending substantially as described." The second claim is "A stationary or poised wood-bending form in combination with the cords, levers, and drum, or their equivalents, and the eccentric clamp or its equivalent, in the manner and for the purpose set forth." The third is "In combination with the stationary form, levers and abutments, I claim the employment of hooks, or hooks and pins, or their equiva-
97 lents, that shall embrace the ends of the wood to restrain the wood in shape and permit the removal of the abutments, after the completion of each operation." He says, in the beginning of his specification, "The machine for bending wood may be divided into two principle groups or classes, the first including all machines in which the bending process commences at one end of the wood and is continued in the direction of the other; and the second, including those in which the form or mould is first applied at or near the centre of the piece to be bent, and the bending process is continued from that point towards each end, which I call bending outward." And

then after making this classification, he goes on to say which class of machines he regards as the superior. Morris, in a part of his specification, says, "Having thus fully described my improvements I do not wish to be understood as claiming them in connection with machines for bending wood where the bending is effected by the rotation of the form; but what I claim as new, &c.;" and stating his claims, which I have already read, of that machine described by Morris and patented to him. The jury have before them what is admitted to be a correct model.

There is some contradictory testimony in regard to the identity of the Morris machine and that made under the Blanchard patent. There are two gentlemen who have testified as experts, Mr. Hibbard and Mr. Drane, who say that they regard them as substantially the same. On the other hand there are three witnesses for the def'ts, Mr. Renwick, Mr. Knight and Mr. Morris, who state distinctly and explicitly that they regard them as essentially different in their mode of operation, and as involving wholly different principles in their action. The jury, having the models before them of the Blanchard and of the Morris machine, will be able, with the aid of the testimony of the experts, to decide whether they are substantially
98 the same in principle. It is claimed on the part of the def'ts that there is a substantial difference in the principle and mode of operation of the two machines, and, therefore, that the def'ts in the use of the Morris machine have not infringed upon the rights of the assignee of the Blanchard patent. I will state very rapidly some of the points in which it is claimed by the counsel for the defendants that there is this substantial difference between the two structures. In the first place it is claimed that the Morris machine bends from the centre to the outer end, whereas the Blanchard machine bends from the end inwards. The jury have seen the operation of these machines, and are doubtless prepared to say whether in that respect the two machines are alike. It is also claimed that the application of the power in the operation of bending is different in the two machines, and that the effect upon the timber bent by the two methods is different; that in timber bent under the Morris patent there is less disturbance of the fibres of the wood; that bending from the centre outwards to the end leaves the fibres more firmley set than they are by the operation under the Blanchard invention. If the jury should be satisfied of this difference in the operation of the two, it will be for them to say whether it does or does not constitute a substantial difference in the principles of the machines. It is also contended that there is a substantial difference in this: that it is one of the main elements of of the invention patented to Blanchard; that there is provision made for end relaxation when the end pressure is to great, and that, upon the principle and theory of the Morris machine, there is no necessity for this end relaxation and therefore no provision is made for it. And another difference very strongly insisted upon by the counsel for the def't, and worthy of the consideration of the jury, is in regard to
99 the form of the mould. Now, it is insisted on the part of the plt'ffs that the stationary mould is fairly to be included within

the claim of the Blanchard patent. Not only does it include, as the counsel contends, the rotating form or mould, but also, by a fair construction, the stationary form or mould. Upon that point, from the best consideration I have been able to give to the question, I am clearly of the opinion that by no fair construction of the Blanchard's patent can it be held to comprehend a claim for a stationary form or mould. It is not reasonable to suppose that "Blanchard" had anything of that kind in his mind when he was preparing his specification. It would naturally be expected, if it were a part of his conception, he would have said in so many words that, though he gave the preference to the rotating form, yet he intended to embrace also the stationary form. But we look in vain throughout the entire instrument for any intimation that he even thought of a stationary form, while all he does say about it relates to a rotating form. I had intended to go more at length into the analysis of the claim, but I find I shall weary the jury by doing so. I therefore make this brief statement of my construction of the Blanchard patent in this particular that the counsel for the plt'ffs may have the full benefit of my ruling. It belongs legitimately to the court to decide whether the patent, by fair construction, embraces the claim for a stationary mould or form, and I announce distinctly as my opinion that it cannot be so construed.

Mr. Lee. I ask your honor for a charge upon the doctrine of equivalents.

Leavitt, J. There is such a thing as the doctrine of equivalents. One thing may be a mechanical equivalent for another. That is the claim of the pl'ffs counsel here—that though Blanchard does not provide for a stationary form, he claims what is a mechanical
100 equivalent for it. Upon this question the jury have the opinions of the experts, and to whom, I think, great respect is due, namely: that this is a substantial difference, not only in the structure, but in the principle of the operation of the two machines.

Mr. Lee. I ask your honor to say to the jury, that if an equivalent is substituted by the defendant for any part of the Blanchard machine.

Leavitt, J. The idea I intended to convey to the jury was, that if they found in the Morris machine, either what is substantially the same, or what is a mechanical equivalent for the other, then they would come to the conclusion that the two machines were identical in principle and operation. There is one principle true beyond all question—that a patent right for a particular structure, intended to accomplish a particular end, does not necessarily import an exclusive right to every possible mode of accomplishing the same end. The doctrine is simply this, as stated in the opinion of the Supreme Court, read in the hearing of the jury: that in order to make out the fact of infringement, there must appear to have been a substantial identity; that the parts of the machine which are claimed to be an infringement of the patented machine must appear to the satisfaction of the jury to be substantially the same; that is, that the same result must have been produced by substantially the same principle or mode of operation. If there is a difference in this respect then it goes to establish the want of identity between the structure. I had intended

to go more at length into the presentation of some of the points arising in this case, but it is unnecessary to detain you longer. I will now briefly recapitulate the points to which you are to direct your attention: First. Is the invention patented to Blanchard new and original? In other words, has he a valid patent for his combination?

If the jury should believe that it is not anticipated by any of
101 the machines which have been exhibited here, or in connection with which proof has been offered, then they would come to the conclusion that, as a combination, there was attached to it the novelty necessary to give it validity. If the jury should come to this conclusion, their next inquiry would be whether that combination had been infringed by these defendants; in other words, whether the Morris structure is identical in principle and operation with that of Blanchard's, and whether the use of it by the defendants is an infringement. I have no doubt that Thomas Blanchard, now deceased, was an ingenious mechanic, and a man of much more than ordinary inventive talents. I have no doubt that the machine that he invented, and for which he obtained a patent, is a valuable invention, creditable to him and useful to the public. And I am equally clear that Morris, in his machine, has exhibited inventive talent of a high order, and has also produced a useful and practical wood-bending machine. It is to be regretted that these parties did not permit each one to go on in the enjoyment of his right under his particular patent, and that it should have been found necessary to resort to litigation to settle their rights. But the case is with you, gentlemen, and it will be your duty to pass upon it, and to say, in the first place, whether the Blanchard patent is valid, as being for a new and original invention, and, if , whether the structure under the Morris patent is an infringement of that patented to Blanchard.

102 Supreme Court of the United States.

The United States of America, to Antoine Puttman, Conrad Weaver, and John Bittinger, greeting:

Whereas Alonzo V. Blanchard, John D. Blanchard, and Franklin Blanchard, partners, as A. V. Blanchard & Co., have obtained the allowance of our writ of error to the honorable the judges of the Circuit Court of the United States, within and for the sixth judicial circuit and southern district of Ohio, directed to remove into the said Supreme Court, to be holden at the city of Washington, on the first Monday in the month of December next, the record of a certain plaint, process, proceedings and judgment, in an action of trespass on the case, wherein you, the said Antoine Puttman, Conrad Weaver, and John Bittinger, in that action lately recovered against the said Alonzo V. Blanchard, John D. Blanchard, and Franklin Blanchard, for costs, as by the said record in the said Circuit Court for said district remaining appears; in which said record and proceedings, and also in the rendition of the judgment thereupon, manifest error hath intervened, as by the said Alonzo Blanchard, Jno. D. Blanchard, and Franklin Blanchard we are informed, and our said writ of error granted, issued

and allowed as aforesaid, for the purpose of correcting the errors aforesaid alledged, if any there be. You are, therefore, hereby commanded and cited to be and appear before the judges of the said Supreme Court, at the city of Washington, at the next term of said court, to be holden on the first Monday in the month of December next, to have the errors aforesaid corrected, and the judgment of our said Supreme Court thereupon.

Witness the Honorable Salmon P. Chase, Chief Justice of the United States of America, this 30th day of October, in the year of our Lord one thousand eight hundred and sixty-seven, and of the independence of the United States of America the 92nd.

[SEAL.] H. H. LEAVITT,
One of the Judges of said Court.

103 OCT. 30TH, 1867.

Rec'd a copy of the within citation; and I do hereby waive farther service of process and enter an appearance in this suit for the defendants in error herein, to wit, Antoine Puttman and others, without prejudice to my right to move for the dismissal of the writ for errors therein. SAM'L S. FISHER,
Attorney for Def'ts in Error.

UNITED STATES OF AMERICA, *Southern Dist. of Ohio, ss.*

George M. Lee, being sworn, says that on October 30th, 1867, he delivered, personally, to Samuel S. Fisher, attorney of record for Antoine Puttman and others, defendants in error herein, a true copy of the within citation. G. M. LEE.

Sworn to and subscribed before me Oct. 31st, 1867,
JOHN McLEAN, *Cl'k U. S. Cir. Ct.*

Endorsed: Sup. C't U. S. Error. A. V. Blanchard & Co. *vs.* Antoine Puttman *et al.* Citation.

104 THE UNITED STATES OF AMERICA,
Southern District of Ohio, ss:

I, John M. Lean, clerk of the Circuit Court of the United States, within and for the southern district of Ohio, hereby certify the foregoing transcript to be truly taken and copied from the files and records of said court, as the same are kept in this office.

In testimony whereof, I have here unto set my handand affixed the seal of said court, at Cincinnati, this third day of December, A. D. 1867, and in the 92nd year of American independence.

[SEAL.] Attest: JOHN M. LEAN, *Clerk.*

105 United States Supreme Court, December term, 1867.

A. V. BLANCHARD, & Co.
vs.
ANTOINE PUTTMAN AND OTHERS.

And the said Alonzo V. Blanchard and others, plaintiffs in error